

# The Boston Medical and Surgical Journal

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March 23, 1922

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### Original Articles.

#### CLINICAL DIAGNOSIS OF CARDIAC CONDITIONS.\*

By WILLIAM E. PREBLE, M.D., BOSTON.

In 1919 there were 7596 deaths from heart disease in the State of Massachusetts, with an estimated population of approximately 3,800,000; or a death rate of 198.4 per 100,000.<sup>1</sup> Of this figure, 7.7 were due to acute heart infections, and 190.7 were due to chronic organic heart disease. I mention these figures to show the tremendous importance of the study of cardiac conditions, both from the standpoint of prophylaxis, and that of diagnosis and treatment.

It is my purpose to try, as far as time will permit, to sum up in this paper some of the more important points in the *clinical diagnosis* of chronic heart disease.

*Never Diagnostic Aids.* The past twenty years have seen enormous additions to our knowledge on the subject. More exact knowledge of the anatomy, physiology, and functioning capacity of the heart has been obtained. Instruments have been devised for taking arterial and venous pulse tracings, for measuring the heart volume in its different phases, for recording the intra-cardiac pressure in the different chambers, and even for recording graphically the heart sounds. The electro-cardiograph has been

perfected, and has vastly increased our knowledge of the incidence and progress of normal and pathological heart impulses. The x-ray has added its share to our knowledge of cardiac hypertrophy and other anatomical abnormalities. The wealth of our newer knowledge is so great, and so much of it has been obtained by the use of these various instruments of precision, that there has been some tendency to discredit our usual methods of physical examination and diagnosis, and to assume that accurate cardiac diagnosis can be made only by experts, together with the use of the x-ray, the electro-cardiograph, and the various other instruments by which our knowledge has been so remarkably increased.

On the contrary, we should assume Mackenzie's<sup>2</sup> attitude as shown by his statement that "In routine practice it is not usually necessary to take graphic records. If one is trained to make careful and minute observations by the ordinary methods, and to have these checked by graphic records, one can ultimately acquire the power of recognizing the majority of movements of the circulation without graphic records."

We should congratulate ourselves that the workers who have so largely added to our knowledge of cardiac physiology and pathology by the use of the various instruments mentioned above, have been able to correlate the pathological and clinical findings so successfully that in most cases diagnoses can now be made without the aid of the instruments.

\*Read before Medical Section, Canadian Medical Association, Halifax, N. S., July 5, 1921.

Much work has also been done in attempting to classify cardiac disorders more scientifically, beginning with Cabot's<sup>3</sup> classification on an etiological basis, and elaborated in much detail in White's so-called triple diagnosis.

*General Divisions.*—We can divide cardiac disorders roughly into (1) valvular, in which there are definite organic lesions of the valves, with or without myocardial changes, and (2) myocardial, in which there is pathology of the heart muscle or conduction system without organic valve lesions.

In this latter class should probably be included cases of so-called idiopathic hypertension, not because they are *primarily* cardiaques, but because they are *potentially* cardiaques, and do not seem to belong in any other class of diseases.

*White's Triple Diagnosis.*—Dr. Paul D. White<sup>4</sup> has worked out a rather elaborate classification, or so-called triple diagnosis, of cardiac disorders. The cases are considered first from an etiological standpoint, and are grouped as rheumatic, arterio-sclerotic, syphilitic, cardio-renal, congenital, thyroid, and miscellaneous; the latter group including hearts damaged by diphtheria, pneumonia, typhoid, and other causes. The second classification is on structural lines—for instance, mitral regurgitation, aortic stenosis, etc. The third classification considers function, as, for instance, auricular (or atrial) fibrillation, paroxysmal tachycardia, heart block, etc. A given heart might be (1) rheumatic with (2) a mitral stenosis and (3) an auricular fibrillation. This triple classification is a distinct advance over previous methods. If the case has a history of rheumatism, whether acute or chronic, prophylactic measures should be immediately instituted in order to prevent recurrence of the rheumatism and further damage to the heart, especially if the patient is young.

In Christian's<sup>5</sup> series of 407 cases of chronic myocarditis, 112 gave a history of antecedent rheumatism. In Cabot's series of 600 cases of heart failure, 278 were classed as rheumatic. In Smith's<sup>6</sup> series of 62 cases of adherent pericarditis, a previous history of rheumatism was found in 28 cases. If rheumatism, acute and chronic, is as important an etiological factor as the above figures indicate, the importance of a classification along etiological lines is apparent. The same statement applies to those cardiaque disorders caused by syphilis and hyperthyroidism. In each of these cases prophylactic treatment should be instituted as soon as the diagnosis is made. The second part of White's diagnosis would be of value mainly in valvular disorders, and the third part in myocardial disorders and for prognosis.

*Diagnosis of Organic Valvular Disease.*—Ten years ago cardiac diagnosis was chiefly a matter of interpreting murmurs. Some of the old ideas regarding valvular disease are still re-

tained, but many of them have been proven unreliable. The following paragraphs on valvular disease are based largely on the work of Mackenzie<sup>7</sup>, Lewis<sup>8</sup>, White<sup>9</sup>, Christian<sup>10, 11</sup>, and Reid<sup>10</sup>, who are in substantial agreement on nearly all important points.

"A very loud, blowing, or rough systolic murmur marking the first sound, heard best at the apex and transmitted well to the axilla and perhaps to back, is good evidence of mitral damage, particularly if there is also a systolic thrill palpable at the apex." A rheumatic history and enlarged heart with above is pathognomonic. Enlargement in region of left auricle and an accentuated pulmonic second sound are also valuable signs. The mere presence of a systolic murmur, whatever its character and point of greatest intensity, is rarely indicative of organic mitral disease, in the absence of other corroborative evidence. Organic mitral insufficiency, without stenosis, is comparatively rare, especially in older people. These murmurs are probably due to poor approximation of flaps, or to stretching of the mitral ring, or papillary muscles, and may usually be disregarded. Although most cardiologists seem to agree that functional regurgitation of this kind is benign and inconsequential, it seems reasonable to suppose that the increased work thrown on the heart, and the slightly increased blood pressure which is so frequently found in these patients, may be conducive to cardiac hypertrophy, and eventually to myocardial disorders. It seems to me that observations carried over a long period of years will be necessary to settle this question.

A presystolic roll at the apex, especially if it begins a distinct interval after the second sound and increases in intensity to the first sound, is *prima facie* evidence of mitral stenosis. It is usually accompanied by a presystolic thrill. The second sound at the base is frequently reduplicated, and sometimes the first sound at the apex. Occasionally the third heart sound is prominent.

White emphasizes the importance of a mid-diastolic murmur, which persists in auricular fibrillation, while the presystolic roll and thrill disappear. The Austin Flint, a late diastolic murmur, sometimes heard in cases of aortic regurgitation, and the Graham Steell, an early, high-pitched diastolic murmur, usually heard best at the third left costal cartilage, should be differentiated respectively from the presystolic roll and the mid-diastolic murmur of mitral stenosis. The heart is almost always enlarged transversely. The myocardium is frequently involved and a large percentage of the cases of auricular fibrillation have a mitral stenosis. Embolism and hemoptysis are fairly frequent accompaniments.

Uncomplicated tricuspid lesions are rare and hard to diagnose. Functional regurgitation is probably quite common. If a mid-diastolic mur-

mur is heard over the lower half of the sternum, especially in the presence of a mitral lesion, tricuspid stenosis may be suspected. Cyanosis and other evidence of venous stasis without decompensation are also suggestive.

**Aortic regurgitation** may be diagnosed from the presence of a diastolic murmur at the left border of the sternum, usually in the fourth interspace, beginning early in diastole, and associated with a Corrigan pulse. Pistol shot sound over the femorals, Duroziez's sign, and capillary pulse are usually present. The heart is almost always enlarged downward and to the left.

**Aortic stenosis** may be assumed from the presence of a rough systolic murmur accompanied by a thrill in the second right interspace, transmitted upward and heard in the vessels of the neck. The aortic second sound is diminished or absent.

**Pulmonary lesions** are rare, unless associated with other lesions. Regurgitation gives an early diastolic murmur to left of sternum without a Corrigan pulse. X-ray and electro-cardiography are of assistance in determining right or left ventricular hypertrophy. Functional pulmonary regurgitation gives the Graham Steell murmur.

**Pulmonary stenosis** is much more common as a congenital lesion than as due to infectious disease. A loud systolic murmur in second left interspace, accompanied by a systolic thrill, and not transmitted to the vessels of the neck, is presumptive evidence of pulmonary stenosis.

Combined valvular lesions may be difficult to diagnose because of neutralization of signs of the individual lesions. It is well to explain the signs and symptoms by the fewest possible lesions.

**Myocardial Disorders.**—While there is a wealth of literature on valvular cardiac disease, comparatively little has been written on disease of the myocardium until within recent years. This was for the reason that before the invention and perfection of the electro-cardiograph, polygraph, and other instruments of precision, comparatively little was known about myocardial disorders. The knowledge acquired through the use of these instruments enables us to clinically diagnose most of the more serious disorders.

Muscle function determines cardiac efficiency. The chief suggestive symptoms of myocardial disease are those of a "weak heart," or heart failure—dyspnea on exertion, orthopnea, precordial pain, faintness or fainting, palpitation, dizziness, etc. Usually patients with any of the serious arrhythmias are conscious of the irregularity. The objective signs are more numerous and more complex. The tick-tack (foetal) rhythm, the gallop rhythm, and the pulsus alternans are always signs of serious myocardial disorder. Of the untoward arrhythmias, that due to auricular fibrillation is the most

common, constituting 50 per cent. of all persistent irregularities, according to Lewis. It is easily diagnosed because of the absolute irregularity—the old "delirium cordis." There is usually a marked discrepancy between the radial pulse and the heart beat as heard with a stethoscope. It may be intermittent, but frequently is constant after its initial onset. While always a sign of serious disease, it should be remembered that many of these patients live for years in comparative comfort.

**Auricular flutter** is a much less common disorder. In this condition the whole auricle beats, but it beats very rapidly, and the impulses are rarely all transmitted to the ventricle. The auricular rate may be from 200 to 350 per minute, and the ventricular rate is usually a fairly constant quotient of this figure divided by two, or perhaps four, but may be irregular. A pulse tracing or electro-cardiogram may be necessary for diagnosis. Signs of cardiac distress plus very rapid jugular pulsation with the ventricular rate an even quotient of the auricular, would be presumptive evidence of auricular flutter. Another point is the rather marked constancy of the ventricular rate, regardless of position, exertion, or the exhibition of drugs.

**Paroxysmal tachycardia** seems closely related to auricular flutter. In this condition the auricular rate is usually 150 to 200, and the impulses are all carried through to the ventricle. The duration of attacks in the same patient is quite constant. The attack starts suddenly, and ends just as suddenly. Sometimes pressure on the vagus will stop the attack.

Probably the most common form of irregularity is that due to premature contractions of the auricle or ventricle. The radial pulse skips a beat, but the stethoscope reveals the fact that one beat follows another at a very short interval, and there is then a compensatory pause until the regular time for the third beat. Most authorities attach very little significance to these premature contractions, or "extrasystoles." However, as they are practically all agreed that auricular fibrillation, auricular flutter, paroxysmal tachycardia, and extrasystoles, are related conditions, there would seem to be reasonable ground for assuming that the extrasystole may be a sign of beginning myocardial disease.

**Cardiac Disorders of the Obese.**—There is one other class of cases I wish to mention, and that is the obese with the so-called "fatty heart." Apparently the symptoms of cardiac embarrassment in these cases may be due either to the deposition of fat about the heart and below the diaphragm, or to actual fatty degeneration of the heart muscle. (Strumpell<sup>11</sup>, Fussell<sup>12</sup>.) At any rate, we know that the very obese are prone to have heart and arterial disease, and to die before their time.

Of 600 consecutive cases of obesity seen in private practice, 388, or approximately 65 per

cent., had mitral regurgitation, functional or organic. Of these, 496 were treated dietetically to reduce their weight. In 58 the murmur disappeared together with all signs of cardiac distress and usually with a marked drop in blood pressure. Most obese patients have a more or less elevated blood pressure which promptly drops to approximately normal, under treatment, provided there is no other cause for the hypertension.

Insurance companies do not reject fat people because of sentiment, as per the old adage that "Nobody loves a fat man," but because they are poor insurance risks, on account of their proneness to develop disease of the heart and arteries.

I mention this class of cases because so little has been written about them, and because in my opinion, they are all *potential* cases of myocardial disease, unless appropriate treatment is instituted.

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#### ANKYLOSIS OF THE JAW.

By R. H. GILPATRICK, M.D., BOSTON.

[From the Surgical Department of the Boston Dispensary.]

A. N., a Holland boy of fifteen years, was brought to the clinic on May 10, 1921, with the following history: At the age of one year he had scarlet fever, complicated by infection of both mastoids, for which some six or seven operations were performed at the time and subsequently up to the age of six, when he migrated to Canada with his family. During the following three years there would appear to have been performed twelve more operations of varying sorts, the last by Dr. Starr at the Children's Hospital in Toronto. This last was a radical mastoid. The notes of the hospital at that time describe an almost complete ankylosis of the inferior maxilla, and the history from the parents would indicate that some marked degree of limitation of motion was evident from the time of the first operations during the second year of life, or fourteen years before coming under our observation.

It is evident from superficial examination at this time that very extensive suppurative processes have been endured, for there are scars over both mastoids, in front of both ears, on the sides of the neck and cheeks, one forward below the angle of the mouth. There is a complete right-sided facial paralysis, evidently as a result of suppuration of the middle ear and in front of the external auditory meatus and possibly from the numerous incisions in that area which have from time to time been made for drainage. The inferior maxilla is markedly undeveloped, as shown in the photographs and the skiagrams. The angles are of the infantile type. There is an unerupted molar on each side, both inclined at a considerable angle with the crowns forward and impinging upon the next teeth in front. There is complete ankylosis with not the slightest degree of mobility either up and down or from side to side. This is said to have been so for the past six years, or since soon after the last operation. There is considerable impairment of hearing on both sides, more marked on the right. The skiagrams of the temporo-mandibular joints are unsatisfactory, as they are likely to be. They indicate, however, a bony union on the right side and a fibrous ankylosis on the left.

How the boy has been able to sufficiently nourish himself, particularly these past six years, is difficult to understand, for he is generally very well developed for his age and is nearly six feet in height. He has had several teeth removed for the purpose of obtaining an entrance for food, but the under jaw being so short, the lower incisors and all teeth save the last molars on each side below fail to meet those above, and the result is that the lower jaw shuts past the upper, the lower incisors being firmly indented into the hard palate about one cm. back of the upper incisors. This has very seriously narrowed the buccal cavity, so that he has very little room for manipulation of the tongue and still less for the reception of food. His method has been to very thoroughly macerate all food, confining himself to such as could be so treated, form it into balls or small masses, introduce these between the lips in front of the gap left by removal of the teeth, then painstakingly force the food through as well as possible by manipulation with thumb or finger, and then carry it about with the tongue to be almost immediately swallowed. It has been a slow and tedious process, as testified to by his mother, and what it must have meant to one with the appetite of an actively growing boy of his age can scarcely be comprehended. He is not at present in any apparent danger from actual starvation, but the handicaps of his present condition are very obvious. Never to have known the satisfaction of a meal, never to have been able to eat other than foods adaptable to complete maceration in the plate, never to have been able to express himself save through tightly clenched and overlapping teeth, without room enough in the mouth even for active use of the tongue, such a combination of distress has made



Before operation, showing complete ankylosis, with lower teeth impressed into palate inside upper teeth.



Before operation, showing deformity from non-development of lower jaw, caused by disease.



Before operation, showing deformity



Before operation, showing deformity.



Ten days after operation. Extent of voluntary movement.



Ten days after operation, showing scars.

him quite heedless of his facial palsy. But in spite of it all he has evidently persisted in a life of activity, both mentally and physically, and is above the average in intelligence.

After some study of the case, it appeared probable that we would have to deal with an extensive union of the condyle of the lower jaw to the glenoid, some considerable involvement of the coronoid insertion of the temporal muscle in the osseous overgrowth all on the right side, and a firm, fibrous ankylosis on the left. Realizing the likelihood of the fibrous ankylosis offering very serious difficulties, we yet decided that the right side would better be attacked first. Some unusual freedom of movement during operation was offered on the right by reason of the seventh nerve, already destroyed, not requiring such careful attention and avoidance. It was determined, however, to proceed, so far as possible, as if the nerve were normal. It was hoped that division of the union about the joint would be sufficient to free that side, and that the left side could then be attacked at the same sitting.

In May, 1921, gas and ether were given by Dr. Temple, at first by the inhaler and later through a tracheal tube, and throughout the rather long operation there was at no time the least limitation of the operative procedure from the anesthesia. An incision one and a half inches in length was made in front of the right ear from a point one-half inch below the zygoma upward and just sufficiently forward to avoid the temporal artery and auriculo-temporal nerve. This was carried down to the bone and all bleeding secured. All further dissection was carried out, so far as possible, with the idea of elevating the parotid and continuing the work beneath it. It was soon demonstrated that the hypertrophic process was much more extensive than had been realized. The whole space beneath the zygoma and extending forward to completely envelop the coronoid process was filled with firm, new bone. The temporo-mandibular articulation was surrounded by a dense mass of the same. A second short incision over the anterior extremity of the zygoma, through which the zygoma could be there divided with the motor saw, made it possible to elevate the zygoma and secure added space. The mass of new bone was gradually eamed and burred out, the condyle of the jaw imputred and the space freed, but still the jaw was as firmly fixed as ever. It became evident that the temporal muscle must be sacrificed, and the coronoid process was therefore removed, leaving the lower jaw without support by either temporal or masseter. When this was thoroughly done, it was discovered that the mouth could be opened. A tonsil gag of the common type was easily inserted and the jaw forced to extreme depression. This demonstrated that the left side was uninvolved and required no treatment. The space above the stump of the condyle of the inferior maxilla and between it and the floor of what had once been the glenoid was further en-

larged and the pterygoids thus brought clearly into view were seen to be apparently normal.

The next step was the preparation of a flap of fat and fascia for the new articulation. This was secured from beneath the skin anteriorly to the original incision, and having as wide a base as possible and the base downward with the belief that by so cutting a better blood supply could be expected. A flap of quite sufficient proportions was thus freed, carried into the cavity over the stump of the condyle and sutured to the pterygoid muscle with fine plain gut. Movement of the jaw was now quite free, so the wounds were closed with a small tissue drain in one. The middle section of the zygoma had been completely freed and was removed, after at first planning to secure it in place by drilling and suture. It was deemed wiser not to prolong the operation or to assume the danger of sepsis being increased.

The immediate surgical convalescence was surprisingly easy. The patient was able to walk to an ambulane on the afternoon of the day of operation, for transfer to another hospital where he had of necessity to go. He was able to move the lower jaw voluntarily and without serious pain from the start. There was considerable edema of the face for two days. The drain was removed after twenty-four hours, and healing was by first intention. By the fifth day he could masticate soft material, and he left the hospital on the eighth day. On two occasions during the first few days a gag was inserted and the jaw carried fully open to guard against the formation of limiting adhesions. From the time of his hospital discharge the usefulness of the new joint has steadily increased. The photographs indicate the degree of motion ten days after operation. He now chews everything, and save for the handicap of the facial palsy is not seriously inconvenienced.

It is believed that some degree of development in this jaw is still possible with normal use. There will, of course, always be the deformity of the receding chin and the facial palsy, but his ability to masticate food and to speak distinctly has been restored to him, and he has been restored to the society of his fellows.

It is evident from the notes of the Children's Hospital of Toronto that it was expected that this boy would return to them for arthroplasty after his recovery from the radical mastoid, but in the meantime his parents again migrated to Massachusetts. The inspiration for undertaking this case came to us from the late John B. Murphy, as so much has come to many for a long time. In his *Surgical Clinics*, Vol. I, No. 6, December, 1912, he reports a case which in many respects was so nearly identical with this one as to be remarkable. The age, sex and duration of the disease are the same in both. In his case there was osseous ankylosis on the right and fibrous on the left. The cause was undoubtedly very similar in both.

Middle ear suppuration, long continuing and

spreading forward, as is so much more likely to be the case in early life than at a later time when the cranial bones have closed up and hardened, entered the temporo-mandibular articulation and after a chronic course resulted in this chronic hypertrophic arthritis. As time went on and the infection persisted in one spot or another, the osteoarthritis extended and evidently resulted in complete ankylosis at about the age of nine years, or six years before our observation. It is worthy of remark that the masseter, temporal and pterygoids on the left side could remain in disuse for so long without permanent impairment of function. In Dr. Murphy's case it was necessary to perform the arthroplasty on the one side and to very extensively free the fibrous ankylosis on the other; not until masseter, temporal and pterygoid insertions had been severed could the mouth be opened. In case of osseous union on both sides it seems doubtful how useful a double arthroplasty of this sort would prove to be, chiefly because of the probability that with free motion up and down a very annoying freedom from side to side would be the result. But so long as one side is normal, or showing but a fibrous ankylosis, the usefulness of the operation is manifest at once. Restoration of function in any ankylosed joint is a desirable object of the greatest importance, the fundamental importance varying with the importance of the involved joint. The comparative rarity of complete temporo-mandibular ankylosis among similar joint lesions has offered comparatively little material for the fat-fascia flap method of arthroplasty in that joint, but save for the difficulty of the needed dissection and the necessity of securing great freedom of movement in a space where free access is limited by the proximity of structures which allow of no inaccurate work, the operation offers a probability of a result completely satisfactory in a disability most distressing, if not actually threatening to life.

#### THE PUBLIC HEALTH STATUS OF AMOEBOIC DYSENTERY IN THE UNITED STATES AS POTENTIALLY INFLUENCED BY THE WORLD WAR.\*

BY C. W. STILES, WASHINGTON, D. C.

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One of the results of the hookworm campaign has been a more general adoption of routine examinations in clinical laboratories, not only in this country but abroad also. Since any examination for intestinal worms, properly carried out by a competent microscopist, is likely to uncover infections with various protozoa, it is not unnatural that a more general interest has been awakened in the subject of the protozoan infections of the intestine of man. Equally

\*Cutter Lecture in Preventive Medicine, Harvard University, Jan. 17, 1922.

natural is the fact that the field of protozoology has developed an increased number of specialists and that zoologists who are especially interested in protozoa should emphasize more than formerly the practical importance of their field. In fact, the influences of the studies on malaria, sleeping sickness, and amoebic dysentery, combined with the practical experience of the hook-worm campaign, have made for the development of medical protozoology as a very specialized field of contact between the physician and the zoologist.

Early in the World War, the theoretical possibility of exchange of zooparasitic diseases among the different units in the war area was obvious to many investigators, and partly from this viewpoint, partly from a more strictly clinical reason, microscopic examinations for intestinal infections received a stupendous impetus and an extensive literature has resulted.

Some of the results brought out by these studies are distinctly startling and it is surely incumbent upon public health officers to study them and to give to them a safe public health interpretation.

In the United States, our very eminent protozoologist, Professor Kofoid, of the University of California and of the California State Board of Health, has been especially active in calling attention to the subject. For instance, in various publications he brings out the point that of 2300 returned troops subjected to a single examination at New York, 12.8% were found to be carriers of the protozoan of amoebic dysentery. As a single examination uncovers only about one-third to one-half of the actual cases uncovered by a six-specimen examination, the conclusion lies near that 24 to 36% of these men were carriers of this infection. Even more startling is Kofoid's finding of 67.7% infection among 91 returned soldiers examined in California. With these startling results it is little wonder that he and others called upon the United States Public Health Service to look into this subject and to be prepared to handle the situation. Kofoid states: "If 12.8% of our approximately 3,000,000 overseas men became infected, there would be 384,000 such carriers or 768,000 if twice this percentage are infected," and he says further: "It is also eminently desirable that the United States Public Health Service, the Red Cross, and other social service agencies co-operate to detect and free, as far as feasible, our returned soldiers from the incubus of this infection in a thorough and effective manner." Kofoid's warning has been taken up by able speakers and we now find that a claim is advanced by some to the effect that in justice to public and to patient, the microscopic examination of the feces should be introduced as a routine measure both in hospital and in private practice.

The Public Health Service was by no means blind to the theoretical possibilities connected with the war, and as early as 1914 the subject of

amoebic dysentery was discussed in this connection. But pressure of other duties, a restricted personnel, and a limited appropriation combined to make it impossible to pay especial attention to amoebic dysentery from a laboratory point of view.

As a result of Kofoid's reports, money was squeezed out, and time was found, to conduct a survey to establish independent and comparative findings, on which to base a policy. These extra examinations were not because I questioned Kofoid's findings, but because I was not entirely convinced that we were justified in going to Congress for the many millions of dollars of appropriation that would be involved in the proposed campaign unless this request for public funds were backed up by ample statistics based upon a more general cross section of the country than was represented by the examinations made at New York and at Berkeley.

One of Kofoid's former assistants, Doctor W. C. Boeck, was engaged to have immediate supervision of the microscopists. The examinations are now completed and tabulated and give us, I believe, a fair basis for deductions which are to be compared with nation-wide clinical experience.

A letter of inquiry, asking whether any increase in amoebic dysentery has been observed, was sent to 607 hospitals and to 115 medical schools; replies have been received from 468 hospitals and from 71 medical schools, representing every state of the Union except 4; only negative replies (190 in number) have been received from 28 states; only negative and indefinite replies have been received from 3 states; thus in at least 31 states, clinical amoebic dysentery has not increased since the Armistice to an extent that it attracted the attention of hospitals and medical schools. From 13 additional states, there have been 24 affirmative, 8 indefinite, and 174 negative replies. Thus out of 206 replies from 13 states, 24 hospitals or medical schools, or 11.7%, report an increase in amoebic dysentery since the Armistice, but it may be remarked that the statistics are exceedingly limited and usually very indefinite; and out of a total of 532 replies, for 44 states, 24 answers or 4.5% report an increase but not in a manner as to give rise to serious concern.

Turning now to our examination of 13,043 specimens from 8,029 persons, in 48 institutions, located in 22 states and the District of Columbia, the findings may be summarized as follows:

Of these 8,029 persons, 44% (3,533 persons) showed either protozoan or worm infection of one kind or another; 39.9% (3,208 persons) showed protozoa; 9.6% (775) showed worms. Thus, intestinal protozoa are exceedingly prevalent, and had we included an examination of the mouth, doubtless 100% of the persons would have shown some protozoan infection. There were 333 persons (4.1%) who showed infection with *Endamoeba histolytica*, the parasite of

amoebic dysentery and these persons were scattered North, East, South, and West, as shown by the map; in fact, every state which sent in a fair number of specimens showed the presence of the protozoon of amoebic dysentery.

Of 196 immigrants at Ellis Island, a single examination uncovered 8.6% (17 cases) as infected; this indicates an infection of 25%.

Of 329 American boys and girls in a training school in the District of Columbia, an average of 5.2 examinations per case uncovered 17.3% (57 cases) as infected.

Of 1,547 civilians (with no military history), 8.3% (129 cases) were uncovered as a result of 3.1 examinations per case; this indicates that probably 13 to 17% were infected.

Of 83 American boys and girls in a second training school in the District of Columbia, an average of 5.5 examinations per case uncovered ca. 12% (10 cases) as infected.

Of 2,584 soldiers who did not go to Europe, an average of 1.3 examinations uncovered 3.5% (93 cases) as infected; this indicates that probably 8 to 9% were infected.

Of 3,536 soldiers who returned from Europe, an average of 1.1 examinations per case uncovered 2.8% (100 cases) as infected; this indicates that probably 7.8 to 9% were infected.

Of 362 persons of unknown military history, 1.5 examinations per case uncovered 3% (11 cases) as infected; this indicates that probably 7 to 9% were infected.

The conclusion would therefore seem justified that on an average the soldiers who served in Europe were not infected with amoebic dysentery any more than are certain other elements of our population, namely, the soldiers who saw only home service, certain groups of civilians, and certain training schools. Accordingly, even admitting that segregation in institutions tends to increase infection with intestinal protozoa (as for instance by infected cooks, waiters, etc.), the segregated troops might have obtained some of their infection in this way, and the evidence is not clear that their service in Europe greatly increased their infection, it is not clear that the returned soldiers have materially complicated the situation in this country as respects amoebic dysentery and it is not evident that we would be justified in going to the public expense involved in trying to search out and treat the numerous carriers of amoebic dysentery presented by the veterans of the late war; the microscopic work alone would cost over \$5,000,000, and the other expenses for hospitalization, etc., would run the cost up to over \$25,000,000.

So far as the rates of infection are concerned, it is safe to concede the point that these are higher than were preconceived before the war, but so far as the significance of these rates are concerned, it seems to me that we must revise former conceptions and must conclude that the

carrier of amoebic dysentery in this country is not such a menace to his neighbors as many of us have heretofore almost taken for granted. Even accepting as correct the very striking estimate that a carrier may discharge 50,000,000 cysts of the dysentery amoeba in a single stool, it is a satisfaction to recall that the chances are infinitesimally small that the cysts discharged by our urban population into the sewers will ever return to man; most cysts discharged into privies will die, but it must be conceded and borne in mind that the fly, which breeds or feeds in the privy is a potential mechanical vector of the infection.

The intensive studies on intestinal protozoa, studies conducted during and since the World War, appear to me to bring out two practical facts very clearly, namely,

**First.**—At least in the temperate climates, the intestinal protozoa of man are by no means of so much clinical importance as has been feared or even assumed. The average case of infection is an interesting demonstration in zoology but from a clinical point of view it is usually of such slight importance that it can be ignored, and I can not concur with the view often expressed that a routine examination for intestinal protozoa and worms is called for in every case of disease; on the contrary, it is only in tropical and subtropical localities that this expense can be justified as a matter of administration; in northern localities, this examination should in general depend on symptoms, namely, it should be made in all unexplained cases of anemia, of amenorrhea, and of intestinal troubles.

**Second.**—At least in temperate climates, *Endamoeba histolytica*, the parasite of amoebic dysentery, is not usually a serious parasite, and its presence in healthy carriers is common. This is not to be interpreted as meaning that it is not a serious menace in the tropics and subtropics. Probably no person of a medical turn of mind who has seen extensive professional service in our Southern States or in the tropics would question the seriousness of amoebic dysentery; but even admitting this, we must conclude that the presence of the cysts, without symptoms of disease, is a far less serious matter practically than we have been accustomed to believe.

In this connection, let it be recalled that there are several other species of amoebae (*Endamoeba coli*, *Endolimax nana*, *Endol. williamsi*, *Dientamoeba fragilis*) which live in the human intestine but it is the species *Endamoeba histolytica* which is of clinical importance. The other species all have their public health significance as proof of unconscious coprophagia and must of course be held in mind in differential diagnosis, but evidence is lacking or unsatisfactory which seems to link them up with *E. histolytica* in clinical importance.

## RELATIVE FERTILITY.\*

SMALL DECREASES IN THE FERTILITY OF TWO INDIVIDUALS MAY RESULT IN A STERILE MATING.

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AND  
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In choosing this title, "Relative Fertility," we have advisedly avoided the term "Sterility."

We are not here considering actual sterility due to anatomic or pathologic causes. Every text-book of gynecology and genito-urinary diseases gives a list of these conditions. They are real and must be dealt with if found, but we do not believe that most sterile matings are due to pathologic or anatomic causes.

It is well known to breeders and others interested in the subject that individuals vary in fertility as they vary, for instance, in coat color or any other characteristic. Certain species are more fertile than closely related species existing under similar conditions. In a very general way we may speak of fertility as being affected by certain external conditions; for instance, it is well known that climate has such an effect. Races which live in the northern climate mature later and have fewer children than races living in the tropics. Diet is another factor which is known to affect fertility. A generous diet, ample in all respects, tends to produce high fertility, whereas if the diet is deficient in certain factors great infertility may be produced. The importance of certain definite elements in diet has been shown by experiments which we have carried on with rats<sup>1</sup> and we shall quote our results in somewhat greater detail a little later. Exercise, or rather the lack of it, has a marked effect. This is exemplified by the lowered fertility of animals kept in close confinement.

The work of King of Philadelphia<sup>2</sup> with rats and the work of various others has shown that inbreeding also very materially decreases fertility, although a point is soon reached where further decrease is not shown.

In addition to these very general factors which affect whole races, there are other factors which affect individuals. That rather elusive and undefinable state of being which we call general condition is probably the most important single factor which affects the fertility of an individual. Fertility may be very markedly lowered in the presence of some toxæmia whether of intestinal or focal origin. Nervous irritability, however produced, has an adverse influence on fertility and may even lower it to a point from which no recovery is possible. Functional disturbances of the genital organs often cause lowered fertility.

To return to the question of diet, let us detail in brief the result of a long series of experiments which we have carried on during the past year and more<sup>1</sup>. We took a race of white rats which had been inbred by Dr. King, brother

and sister matings for thirty-three or thirty-four generations. Dr. King has reported to us her statistics on the fertility of selected individuals as being about 80 per cent. In our experiments, however, we used all the rats produced without selection. We found that the fertility of these rats was about 65 per cent., that is, in about 65 out of every 100 matings young were produced. A very interesting observation was made at the very start of our experiments, and as this led to the formulation of what we may call our theory of fertility it is necessary to explain it at some length. This fact was that, although only 65 out of every 100 matings were productive of young, yet on persistent re-mating every individual proved to be fertile with some other partner, even though it might have had as many as 4, 5 or even 6 unproductive matings previous to that. Every individual, therefore, was fertile, but the fertility of some individuals was vastly greater than that of others. It proved to be possible by checking up these re-matings, especially when they included matings with animals of known fertility, to calculate an index of the fertility of each individual. These results varied from .9 to .36 and averaged about .8 for all the rats concerned.

If in order to explain these results we make certain assumptions calculate from them the fertilities which should theoretically be produced, and on turning to the actual results of the breeding experiments, find that the same, or closely similar, percentages were in fact obtained, we may fairly conclude that the assumptions are sustained, in so far at least as the small numbers used warrant any conclusion.

We will assume then that the fertility of a mating may be fairly expressed as the product of the individual fertilities of the individuals concerned, and in written form by the formula.

The fertility of the male  $\times$  the fertility of the female = the fertility of the mating or, for brevity,  $m \times f = M$ .

We will assume that when individuals of the same parentage have been reared under the same life conditions and subjected to the same change in those conditions, their fertilities will be affected in substantially similar degree whether the individual is male or female. Then if in a given class we make 10 matings, of which 5 are fertile, the average mating fertility of this class would be .50 and the formula would be  $m \times f = .50$ , but if in this formula both individuals are of equal fertility it follows that the fertility of either individual is equal to the square root of .50. The square root of .50 is approximately .7 (.7  $\times$  .7 = .49); hence if our assumptions are correct the formula for a class in which 10 matings give 5 fertilities would be  $.7 \times .7 = .5$ . If we now apply these formulae to the 23 matings of Dr. King's rats on our stock diet we obtain the following results. There were 31 individuals involved in these 23 matings. In the case of 22 individuals the first

\*Read at the Newton Medical Club, Dec. 12, 1921.

mating resulted in prompt reproduction. We may safely conclude that these individuals were of the average mating fertility of King's strain which she gives as .8 (the square root of .8 is  $.9 \times .9 = .81$ ) which may then be taken as the individual fertility of these 22 rats. The other 9 individuals all eventually reproduced, but in their case the number of matings required before a result was obtained varied from 2 to 7. Estimating their individual fertilities by the same method, *i.e.*, by the percentage of mating fertility in the whole group of matings in which the individual was concerned, and taking the square root of the mating fertility as the fertility of the individual, adding the individual fertilities of the whole class and dividing by 31 we got an average individual fertility of .82 for the whole group of 31 rats. If these assumptions are correct, or nearly so, this figure (.82) should approximate that obtained by taking the square root of .65 which was our observed index of mating fertility for these rats. This square root is .81, and the comparison is close enough to warrant the assumption.

When we calculate equations for all the matings concerned and arranged these in series, we found that there was a level in this series below which all matings were unproductive but above which young might invariably be expected. This level we called "The

TABLE 1. SCHEMATIC CHART OF FERTILITY.\*

Individual Fertility	Mating Fertility, per Cent	Threshold for Reproduction	Reproduction
$1.0 \times 1.0$	100 or 100		
$0.9 \times 0.9$	81 or 81		
$0.8 \times 0.8$	64 or 64		
$0.7 \times 0.7$	49 or 49		
$0.6 \times 0.6$	36 or 36		
$0.5 \times 0.5$	25 or 25		
$0.4 \times 0.4$	16 or 16		
$0.3 \times 0.3$	9 or 9		
$0.2 \times 0.2$	4 or 4		
$0.1 \times 0.1$	1 or 1		

\* The figures in this table very from those actually obtained from the matings of the two partners, given the fact that the index of clearance is the establishment of 45 per cent as the threshold for reproduction must, of course, be regarded merely as an approximation until larger numbers have been employed.

Threshold for Reproduction." (See Table 1.) The threshold was not only approximately accurate when the rats used were of equally decreased fertility, but also held true when a rat of lowered fertility was mated to one of higher or full fertility (*e.g.*,  $1.0 \times 0.5 = 0.50$  = reproduction,  $0.8 \times 0.4 = 0.32$  = a sterile mating, etc.).

Repeated experiments showed, moreover, that if rats whose individual fertility had been decreased to, for instance, 0.6 were mated, their mating was sterile and remained sterile so long as these rats were kept together; but that if these rats with individual fertilities of 0.6 were each remated with highly fertile rats from Dr. Castle's strain the matings would both prove fertile. This observation is not a chance observation, but was proved in our experiments in 37 instances, and is, we believe, capable of explaining many problems which arise in infertilities of the human race.

We have gone somewhat fully into these theoretical considerations because they help us to understand what takes place when fertility is lowered. We have told you the various natural conditions which may bring this about. It remains to give you the results of our laboratory experiments in which the result was produced by alteration of diet<sup>1</sup>. It has long been known that poor feeding of laboratory stock will affect its breeding qualities. McCollum<sup>2</sup> of Johns Hopkins and Osborne and Mendel<sup>3</sup> at New Haven showed conclusively that deficiencies in certain important elements would lower fertility. Our experiments were in the nature of a repetition of these giving, however, particular attention to breeding records. We submitted our rats to four deficient diets. These diets were carefully calculated with advice of Dr. McCollum to reduce fertility without affecting health. The first was low in the Fat Soluble Vitamine, and, although it definitely affected growing individuals which were subjected to it, the results were not as universal nor as striking as those on a diet made low in calcium, or on another diet with a low percentage of protein. As may

TABLE 2. RESULTS OF MATINGS OF VARIOUS DIETS (KING X KING RATS).\*

Diets	Number of Matings	Number of Positive Matings	Percent- age of Mating Fertility	Percent- age of Individual Fertility
Stock diet	23	15	65	81
Low fat soluble vitamine diet	8	4	50	70
Proved.....	8	4	50	70
Unproved.....	0	0	0	0
Low calcium diet	32	4	13	35
Proved.....	7	1	14	37
Unproved.....	0	0	0	0
Low protein diet	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0
Double deficiency diet (low in calcium and protein)	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0

\* This table shows the result of matings in which both partners were King rats and both were on the indicated diet.

be seen in table No. 2, rats which had previously been proved to be fertile showed on the Fat Soluble Vitamine diet a percentage of .50 as compared with .65 for the normal. Growing animals on this diet were still further reduced in fertility to .31. On the low calcium diet the percentage was reduced to .14, while on the low

TABLE 3. RESULTS OF REMATINGS OF VARIOUS DIETS (KING X CASTLE RATS).\*

Diets	Number of Matings	Number of Positive Matings	Percent- age of Mating Fertility	Percent- age of Individual Fertility
Stock diet	10	7	70	70
Low fat soluble vitamine diet	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0
Low calcium diet	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0
Low protein diet	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0
Double deficiency diet (low in calcium and protein)	0	0	0	0
Proved.....	0	0	0	0
Unproved.....	0	0	0	0

\* This table gives the results of remating rats from the negative matings of Table 2 with Castle rats of known fertility. Since such Castle rats are of proven fertility, 100 per cent fertility is the index of average individual fertility of their King rat partners. This is the index of mating fertility. It will be seen that the individual fertilities of rats on the deficiency diets are so low as to have insured sterile matings with partners of the same grade (Table 1).

protein diet none of the five matings produced young. We also submitted them to a fourth diet which was deficient both in calcium and in protein, and the results on this diet were even more striking as the deficiency in this case was sufficient to produce visible ill health.

All the animals whose matings were infertile were re-mated while still on the diets with highly fertile partners, whose fertility had been thoroughly tested previous to these experiments. (See Table 3.) Nine out of 20 of these sterile rats on the low Fat Soluble Vitamine diet promptly proved to be fertile. In the same way 6 out of 19 on the low calcium, and 6 out of 12 on the low protein diet produced young. Now these facts are very difficult to explain, if it is assumed that the rats on diet which do not have young are sterile, for by merely changing partners we find that in matter of fact they are fertile. This anomaly is, however, very easily explained by assuming that the diet has merely lowered the fertility of the individual concerned. For instance, on the low Fat Soluble Vitamine diet the percentage of mating fertility was .31. Remembering our formula that  $m \times f$  is = to the mating fertility, which in this case was .31, and that males and females in this experiment are of equal fertility, the percentage of each individual becomes the square root of .31 or .55, but this, of course, represents only an average. Some individuals would probably be as high as .7 or .8, others as low as .3 or .4. When the more fertile individuals happen to be mated together young would result, e.g.,  $.7 \times .7 = .49$  which a reference to Table 1 will show to be above the threshold value, whereas  $.4 \times .4$  will be far below that line, and no young can be expected. In general, those individuals whose fertility is below the average of .55 will when mated with rats of decreased fertility prove unproductive, but if as shown in Table 3 they are re-mated with 100 per cent fertile individuals a certain number, in this case 9 out of 20, will produce young.

Lowered fertility is something which cannot be diagnosed alone from history or general physical examination or even from the most comprehensive local examinations, but which is capable of being estimated for the individual case by combining all methods. The various factors which we have learned to associate with this condition do not appear to effect all individuals in the same way. Many individuals preserve full fertility in spite of poor general condition resulting from overwork, nervous fatigue, errors in diet or even actual disease, but there are many others whose fertility is the first thing to suffer from these same causes. It should be noted that a similar individual variability was observed with our rats. We are not able to give any adequate explanation for this. One fact has, however, assumed importance in a broad view of a good many such relatively infertile individuals; and that is that a great

many of these individuals show the stigmata of poor development.

These stigmata are more capable of being recognized in the female, although some of them obviously apply to both sexes. In the first place, the weight is as a rule far below the average for a given height and age. The patients stand badly and usually assume the posture associated with ptosis—partly as a result of ptosis and partly from the under-development they are apt to complain of indigestion, headaches, chronic fatigue, constipation and dysmenorrhœa. Locally one finds the anteflexed cervix, pinhole os and small fundus so common in these cases. Under the microscope the cervical secretion is seen to contain an excess of mucus in which are embedded an abnormally large number of leucocytes. Sometimes the number of leucocytes is large enough to render the secretion muco-purulent. It is not unusual to find the ovaries enlarged and containing many small cysts which represent Graafian follicles that instead of maturing have retrogressed with degeneration of the ovum. Such condition probably occurs normally to a mature Graafian follicle once in a while and is an accompaniment of the normal atresia of the many ova which never reach maturity; but when all or many of the follicles undergo this degenerative change the ovary becomes tense and in time the capsule becomes so thickened that no ova can be released. Occasionally also we find the ovaries containing corpora lutea which instead of undergoing the normal involution persist and not infrequently become cystic. The persistence of these corpora is often associated with changes in the menstrual cycle and almost invariably interferes with ovulation.

In the male the general considerations are the same as with the female. Here again certain local findings are often associated with underdevelopment. They are most clearly demonstrable by examination of the semen. In the first place, the number and vitality of the spermatozoa may be greatly diminished. This failure of spermatogenesis is usually found where the testicles are small and soft. It is not a diseased condition and where of not too marked a degree is capable of being corrected by stimulative treatment. Sometimes spermatogenesis is normal, but the secretion from the prostate is sufficiently altered to affect vitality of the spermatozoa. In this case the semen often contains a high percentage of stringy mucus, and there are present large numbers of the so-called prostatic concrements. The spermatozoa are seen to become entangled in the mucus and, if the process is sufficiently extensive, to be killed outright. The prostatic condition which gives rise to this altered secretion has such slight symptomatology that it would be often unrecognized were it not that the microscope calls our attention to it. Such a prostate is not as a rule enlarged, but is much more irritable than normal,

and is felt to contract when touched by the examining finger. If a specimen of urine is passed after such an examination it will be seen to contain small, translucent shreds. Under the microscope these shreds are found to consist of mucus in which many leucocytes are entangled. The great similarity between the altered secretions of the cervix and prostate is worthy of mention.

In addition to the functional disturbances in the male and female elements, it is possible, perhaps because of them, to have functional disturbances of the fertilized ovum<sup>5</sup>. This is a subject which has not been as yet thoroughly investigated, but for which there is accumulating a great deal of clinical evidence. It might account for many cases of habitual miscarriage in which syphilis is known to play no part. It might also be a determining factor in certain cases of maldevelopment. As yet we can make no definite statements in regard to it.

As illustrative of these various principles, we wish to cite a few typical case histories. As is so common in dealing with cases of any particular classification in actual practice, it is often difficult to draw hard-and-fast lines and to say, for instance, that a given sterile mating is caused by this or that single factor.

To cite a simple case first in which the cause of the lowered fertility could be definitely discovered and where its removal was followed by prompt pregnancy.

The couple had been married for four years. A direct examination of the male proved him to be highly fertile. The woman, however, had a very sharp anteflexion of the cervix and the cervical secretion, which was muco-purulent, entangled and killed all spermatozoa. The rest of the examination was entirely negative. She was operated on, the anteflexion was corrected and the uterus and cervix thoroughly curetted. After operation it was necessary to give her repeated treatment of the cervix before the character of the secretions was finally returned to normal. Four months after operation she became pregnant. We consider this case to be extremely instructive because it illustrates the fact that free drainage followed by persistent after-treatment will clean up even a very bad muco-purulent secretion.

Few cases, however, are as simple as this one, and in the next the character of the secretions forms only a secondary part in the whole picture.

These patients had been married five years. There had been a miscarriage at six or seven weeks soon after marriage but nothing since. Here again the male proved to be fertile. In this case also there was an extreme anteflexion of the cervix with altered secretions. The uterus was retroverted, and both ovaries were felt to be enlarged. In the post-coital examination the spermatozoa were entangled and killed in the cervical secretion. At operation the cervix was treated as in the previous case. An abdominal

incision was then made and the uterus suspended. Adhesions about both ovaries were broken up and a corpus luteum cyst in the left ovary evacuated. It was evident that the cervical condition was only one element in this case, and that, though the cervical plastics were essential they would have yielded no result if performed without the abdominal. This patient was also ten pounds under weight. She made a normal convalescence and gained weight and strength on the diet prescribed for her. Without the necessity of further local treatment she became pregnant six months after operation. We feel that the important element in this was the corpus luteum cyst in the ovary.

Not infrequently we find trouble on both sides. As a rule, these cases are not as favorable as those in which there is trouble of even quite a marked degree on one side alone, but a fair proportion of such cases is successfully treated. This is illustrated by the following case:

The patients had been married for five years without a pregnancy. On examination the woman was generally under-developed. She stood badly, and she was about thirty pounds under weight. Locally there was a marked anteflexion with pinhole os. The man had a large double varicocele, but was otherwise in good general condition. A direct examination of his semen, however, showed him to have a marked reduction in the number of spermatozoa and the motility was poor. We advised him to have his varicocele operated on. This he did, and there was such a marked improvement in the character of the direct specimen that we advised his wife to have the cervical condition corrected by an operation similar to that noted in the first case. Four months after operation she came in for examination and proved to be pregnant. She is now awaiting her confinement.

Naturally there are many cases in which the outcome is not as favorable as those we have reported. This is particularly true of the cases where there has been a lowered fertility of either partner of long duration.

A couple first consulted us early in 1918. They had been married for five years, and investigation showed this to be a case of lowered male fertility. Previous to marriage the husband had been in hard training for some seven years. After marriage, however, he went into an office and gave up exercise altogether. No pregnancy resulted after two years. At this time he again took up hard training, and his wife promptly conceived. Then came the war with still harder and more confining office work together with a responsibility far beyond his years. His general physical appearance was excellent, but a direct examination of his semen showed very few spermatozoa present and the motion of these not over good. We advised him to get as much hard exercise in the outdoor air as was consistent with keeping up his work, to

take a stimulative diet rich in protein food of animal origin, such as meat, eggs, fish, cheese, etc., and plenty of milk and butter, together with the usual amount of vegetables, fruits and starches. Such a diet is rich in the Vitamines, and is known to have a definite stimulative action on spermato-genesis. In addition, we put him on Extract of the Anterior Lobe of the Pituitary Gland. His semen has made a very considerable improvement to date, but so far there has been no pregnancy. From a consideration of the circumstances under which the only child was conceived, it has seemed to us most probable that our failure in this case is due primarily to the fact that the patient has been unable to carry out an adequate regimen as to amount of work and exercise with freedom from business worries.

In the nature of the case it is difficult to find human histories which illustrate the effect of deficient diet as seen in the rats. We believe that diet plays a very important part in the treatment of most cases. It is certainly true that an abundance of the important elements tends to increase fertility. This was clearly shown in the preceding case where marked improvement in the quality of the spermatozoa has followed a stimulative diet. It is also probably equally true that deficiency lowers fertility. It is rare, however, that deficiency in a single element can be found in the patients whom we see. It is more common perhaps to get statistical evidence of this effect where there have been famines or other disturbances in the normal food supply of whole countries. This is well illustrated by the lowering in the birth rate which has been reported in Austria and other European countries since the war. We have, however, one case which illustrates the effect of a calcium deficiency.

The husband was normal in every way and thoroughly fertile. The wife was a large well nourished woman in ordinarily good health, but reported herself as lacking in energy and constantly tired, perhaps in a condition quite comparable to that of the single deficiency rats. They had been married seven years. Ten months after marriage she was delivered of a full term child which was alive at the beginning of labor, but died during an operative extraction. During the succeeding six years she had five pregnancies which resulted in five early miscarriages. These people were in the habit of maintaining a very ample table, and a deficiency in diet seemed absurd; but since an exhaustive examination failed to reveal any other cause for the habit of abortion, an inquiry was instituted. It was found that during her first pregnancy (which went to term) she had eaten everything, but that finding herself growing stout soon after the birth of the child she had then begun to restrict her diet. On analysis it proved that she had been living for the six years during which she had miscarried repeatedly, on a diet which was very deficient in calcium. She was at once

put on large doses of calcium, her diet was rearranged to include foods rich in calcium and after a reasonable interval the medicinal calcium was discontinued. She went into her seventh pregnancy shortly afterwards and without any other treatment was delivered at term of a healthy child.

From a consideration of these cases it is very evident that the question of treatment is an involved and intricate one depending entirely as it does on the specific cause or causes of the infertility and it is evident that treatment must be preceded by an accurate differential diagnosis of the cause or causes. Where it is a question of lowered fertility from any cause there are certain general factors which should receive attention, and these remarks apply equally whether it is the man or woman who is found to be at fault. In the first place the general condition must be brought to the point of maximum efficiency and here an intimate study of the life of the patient is a pre-requisite. A stimulating diet which will include an abundance of protein food of animal origin and an excess of the various vitamines and of calcium is prescribed in every case. In order that this diet may be digested and assimilated a large amount of outdoor exercise is necessary. Business cares and worries should be eliminated. If the individual is under weight or suffers from ptosis these things must be remedied.

Local conditions in the male which are susceptible of treatment must be attended to by a trained genito-urinary surgeon. Where no abnormalities exist and the defect seems to be due to a partial failure of spermato-genesis it is often possible to do much by using certain of the glandular extracts in addition to the diet and general care.

In the female the local defect is often mechanical and the result of poor development. Such conditions demand mechanical treatment and this is furnished by the various plastic operations on the cervix and ovaries. Where endocervicitis has existed for some time it is usually necessary to follow up the operation by detailed and often prolonged office treatment of this condition. As in the male, occasionally cases are found where the defect is due to under activity of the gonads. In such cases appropriate organo-therapy is apt to be successful.

In conclusion let us emphasize the importance of distinguishing between lowered fertility on the one hand and actual sterility on the other. That this distinction is of more than academic importance we feel has been amply demonstrated.

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## PATHOLOGY OF TUBERCULOSIS.

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Boston, Mass.

## Introductory.

Mr. Chairman, Members of the Society, Ladies and Gentlemen:—It is my purpose this morning to discuss with you the more important tuberculous lesions from a pathological point of view. In the limited time at my disposal, I cannot go into very much detail, and shall confine myself almost entirely to the pathological conditions associated with tuberculous disease of the lungs. These pathological processes are illustrated in a series of gross and microscopic specimens which will be passed about, and can be examined more leisurely at the close of the morning.

## History.

In any discussion of the pathology of tuberculosis, the evolutional history of the disease is obviously of primary interest and importance. Even in the time of Hippocrates and Celsus, the anatomical lesions of pulmonary tuberculosis were recognized and included under the term "phthisis." From that time until the latter part of the eighteenth century, little was contributed to the morbid anatomy of the disease.

At that time the name of Mathew Baillie (1760-1823) stands out as of particular note. He was the first to describe the anatomical tubercle. It is a tribute to his accuracy of observation that his original description still stands the test of time.

Next, C. L. Bayle (1764-1826), a French physician, contributed somewhat further to the description of tuberculosis. In 1811, he published a small volume describing five of its principal forms. He was the first to describe the so-called "granular tuberculosis" which, in the light of later investigation, corresponds to the acute miliary form of the disease.

Following these men, Laennec (1781-1826) is the next great name to be associated with the development of our knowledge of tuberculosis. With his invention of the stethoscope, the clinical relationship to the pathology was established. He was the first to suspect the unity of the widespread difference in the anatomical lesions, and their infectious character.

In Rokitansky (1804-1880), another conception of its unity was advanced—that of its humoral nature—with the production from the blood of a mother liquor termed "blastema," and the development of a variety of lesions due to variations in the tissue reactions to this substance.

With Virchow (1821-1902), the theory of the duality of tuberculosis was developed, a separation of the lesions of the lymphoid tissue

from those of the lung, terming the former seroful, and the latter catarrhal pneumonia. For many years this dual conception of the nature of tuberculous lesions was held.

In the meantime experimental work was advancing, and we find one of the most interesting periods in the history of tuberculosis. The names of Villemain (1865) and Cohnheim (1838-1890) are perhaps the most familiar. They established indubitably the infectious nature of the condition by the injection of tuberculous material into experimental animals, with the reproduction of the disease in them.

It only remained for Robert Koch, in 1882, to report the discovery of the organism producing tuberculosis, to definitely establish the unity of the great variation in lesions caused by the tubercle bacillus, and to stimulate a widespread study of their histological pathology.

Following Koch, probably the most important work is that of Theobald Smith, who has contributed the greater part of our information concerning the differentiation of bovine from human tuberculosis.

## Etiology.

The offending organism is so well known now, that only a very hasty summary of the more important morphological and cultural characteristics seems indicated. Suffice it to say, that there are at least four recognized types of tubercle bacilli,—differing chiefly in their cultural properties,—the human, bovine, avian, and piscine, of which the first two are of pathological significance in the production of tuberculosis in man. Of these, the human type is by far the most common, being the responsible organism in over 90 per cent of cases. This bacillus is a slender rod, 2-4 micra in length, and 0.2-0.5 in width. It may be straight or slightly curved. It stains with anilin dyes with some difficulty, due to a waxy capsule, but is "acid-fast" (resistant to decolorizing by acid alcohol). It stains irregularly with bead and vacuoles. It is a relatively difficult organism to cultivate—is strictly aerobic, and grows best on a medium containing glycerin. The bovine type occurs as a somewhat thicker, shorter rod, with the same staining reactions. It is grown with even more difficulty than the human type.

## Pathogenesis.

The pathogenesis of tuberculosis is a complex problem about which still rages a very considerable storm. The scope of this paper does not warrant entering into any discussion of the problem. I merely venture to bring forward a few of the results which careful students have gradually collected in the past forty years.

First, there is the question of the mode of infection. Nearly all workers are agreed now that tuberculosis is not transmitted to the off-

spring before birth. In other words, that with the exception of a few rare cases of placental tuberculosis, tuberculosis is not, strictly speaking, ever congenital in origin.

The relative importance of the aerogenous and enterogenous routes has long been one of the most bitterly fought problems. Certain it is, that both portals of entry may play a part, and that neither method of inoculation is always obvious, as, particularly, in bone tuberculosis. The rôle of the hilus lymph-nodes is one of the *bêtes noires* in settling the dispute. Whether tuberculosis of the bronchial lymph-nodes is primary, or whether it is secondary to pulmonary lesions, has not been accepted completely by either side. Autopsy statistics from Hedren, Ghon, and others, suggest very strongly a pulmonary focus of longer duration than the lymph-node lesions.

Another problem which the pathogenesis raises is that of the age incidence of tuberculosis. Metcalf reports figures from many observers which seem to prove that at birth the cutaneous reaction of Von Pirquet is negative; at two years, there is a 10 per cent. incidence of positive reactions, and at fifteen years, less than 10 per cent. are negative. In other words, by puberty, nine out of ten children have become infected by the tubercle bacillus. These figures are confirmed independently by Naegli and Reinhart, who quote an incidence of from 93 to 96 per cent. of tuberculous lesions in their adult series of routine hospital autopsies. In addition, the statistics of Hedren, who found 199 tuberculous cases in 690 routine children's autopsies; of Ghon, who found 184 cases out of 644 children's autopsies; of Wollstein, with 178 cases of tuberculosis in 1320 autopsies at the Babies' Hospital; and of the Infants' Hospital in Boston, where 40 tuberculous cases have occurred in the past 200 autopsies—all show the high incidence of infection in early life.

Gradually, however, the view that adult tuberculosis is the lighting up of a focus acquired in infancy or childhood, seems to be becoming more and more generally accepted, and the theory of reinfection, or primary infection, in adult life, is falling into greater disrepute.

Whether the theory of aerogenous or enterogenous inoculation is the correct solution; whether the organism penetrates the alveolar epithelium or the intestinal mucosa without stimulating any immediate reaction, and glandular tuberculosis is primary; whether infection may be by the tonsillar ring or by carious teeth; whether the organism is of the bovine or of the human type—all these theories, after all, make very little difference in the end-result; in the pathological lesions which we recognize by clinical signs and symptoms, and by gross and microscopic characteristics. And so we come

to a discussion of these lesions as we find them in the human body.

#### *Morbid Anatomy.*

In a discussion of the morbid anatomy of tuberculosis, we must first recognize the miliary tubercle as the pathological unit and the variegated appearance of tuberculous lesions in the body as being due to the same causative agent, affected variously by the anatomical structure of the individual organ involved.

The reaction of the individual to the tubercle bacillus varies so tremendously that it is difficult to describe the lesions in any satisfactory way. The reaction may be entirely proliferative, it may be entirely inflammatory, or it may be, as it most commonly is, a combination of the two. Again, in bone tuberculosis, the lesion may be, at first, largely a destructive one before proliferative changes begin to occur. In the simple proliferative reaction, we see perhaps the best example in the lymphoid tissues. Of the inflammatory type of reaction, the pneumonic exudate is perhaps the most striking.

The miliary tubercle itself—so called originally from its resemblance to a millet-seed—is recognized as a proliferative reaction attempting to remove a foreign body. The tubercle bacillus, with its dense, waxy capsule, is intensely resistant to the ordinary phagocytic activities of polymorphonuclear leucocytes, and attracts the large mononuclear cells whose origin is still the object of much experimental controversy. These cells are certainly, in part, derived from the vascular endothelium of the immediate vicinity and migrate to the affected area, as shown by Foot, and others, with vital stains. The term "epithelioid" has been applied to these cells which are probably both of endothelial and fibrous tissue origin, from their similarity in appearance to epithelial cells. They accumulate about the organism in such numbers as to occlude the blood supply to the part. They likewise tend to be arranged radially on their long axes. Certain of them may fuse about the bacilli and form the so-called "giant-cell" which appears as a syncytial mass of cytoplasm containing several oval nuclei tending to be distributed peripherally in the cell, giving it a "horse-shoe" appearance. By proper staining methods, the organisms are sometimes found centrally in such a cell. Accompanying this cellular reaction there is a marked deposit of fibrin throughout the tubercle.

As the area becomes avascularized, a characteristic necrosis of the tissue centrally takes place, termed "caseation." This cheesy-like appearance is due very largely to the fatty substances present in the phagocytic cells and the bacterial capsules.

Next, about this central zone of caseation there occurs a further inflammatory reaction in

which both fibroblasts and mononuclear cells, chiefly of endothelial origin, take part—tending to encapsulate the necrotic area. Lymphocytes and polynuclears wander into this zone in varying numbers, attracted, in part, by the necrotic tissue. They are indicative of the chronic inflammatory character of the lesion.

Thus we have formed a definite unit which, even without the demonstration of the organism, is sufficiently characteristic, microscopically, to be diagnostic of the disease. Its central area of caseation in which a shadowy appearance of the normal fibrous stroma persists for a long time, a zone of proliferating young connective tissue and mononuclear cells arranged typically in radial fashion, usually with one or more "giant-cells," and a varying amount of inflammatory cellular exudate about the periphery, presents a histological picture unlike anything else in pathological histology.

This initial lesion may extend laterally by tubercle bacilli which are carried to the periphery of the lesion by phagocytic cells and start up new areas of caseation which may fuse to form a larger or "conglomerate" tubercle. In its extension, such a lesion may erode a blood vessel, a lymphatic or, in the case of the lung, a bronchiole. Dependent somewhat upon which system becomes involved, a new crop of tubercles starts up where the bacteria lodge.

This factor is of the utmost importance in the distribution of the new lesion; thus, in involvement of a bronchus the result is an inhalation infection and the new tuberculous foci have a relatively peripheral distribution in the lung—in the terminal alveoli. On the other hand, the new tubercles which arise from a blood stream infection tend to be equally distributed through all parts of the lung. In the case of the lymphoid tissue, practically every infection of the lung results in secondary involvement of the hilus lymph-nodes from the anatomical relation which these nodes bear to the normal drainage of the lungs.

#### *Acute Miliary.*

And now we come to a pathological classification of the tuberculous lesions of the lung. First of all, there is the acute miliary form. This arises by a general blood stream infection, usually associated with generalized miliary tuberculosis. It is particularly common in infancy and makes up over 90 per cent. of the fatal cases under one year of age. It is an acute disease with no time for the formation of the more chronic lesions. It usually arises from the softening of a tuberculous thrombus, or of rupture of a tuberculous lesion into a blood vessel, or from thoracic duct involvement. In the forty cases cited from the Infants' Hospital, it is interesting to note that all but two cases presented acute miliary lesions. This specimen from a child of three is a very

striking example of miliary tuberculosis (CH A-21-3).

In such cases it is the rule to find miliary lesions scattered through the other organs—thus the liver, the spleen, the kidneys, the lymph-nodes, and the meninges are particularly prone to be involved secondarily, and we see a fulminating type of the disease in which the lesions have not had time to progress beyond the miliary stage.

These miliary lesions present the general histological picture just described. It often happens, however, that the original focus of infection remains a constant source of supply of organisms over a considerable period of time. So it is not infrequent to find miliary lesions in all stages, from the very earliest proliferative reaction of a few endothelial cells to a late lesion which marked caseation and conglomerate tubercle formation. Under the microscope miliary tubercles of all ages can be found with a terminal overwhelming generalized infection in which the organisms are found almost in colony formation centrally in a new acute series of tubercles. The immediate source of infection in this case was the thoracic duct. Whether the primary lesion occurred in the lung or in the hilus lymph-nodes was not determined, as the lung tissue was preserved in gross.

#### *Chronic Tuberculosis.*

In the next place, we have chronic tuberculosis of the lungs. In this condition we find a variety of lesions which resolve themselves into three elements on careful histological examination—(1) miliary and conglomerate tubercles; (2) tuberculous pneumonia, and (3) cavitation from softening and abscess formation. Associated with these, we may also find tuberculous thrombi, tuberculous ulceration of the bronchi, and tuberculous lymphangitis.

Probably the best general description of these pathological lesions is found in MacCallum's *Textbook of Pathology*. I will pass around some of the more striking illustrations from his book. Certain of these gross specimens also are good examples of the various stages, but unfortunately, by preservation, have lost some of their color values. The attached legends are more or less self-explanatory.

#### *Miliary and Conglomerate Tubercles.*

In the miliary and conglomerate tubercles found in chronic pulmonary tuberculosis, the most noteworthy point is their distribution. Instead of an equalized distribution, they are found chiefly with a peripheral arrangement. This is due to the fact that the new tubercles as they form, originate in terminal alveoli by inhalation, or in the smaller lymphatics, and are not distributed by the blood stream. Again, as a rule, these lesions show more of a proliferative and inflammatory reaction about them—there is much more fibroblastic activity, much

more evidence of attempted repair. Whether this is due to a variation in the virulence of the organism or to the individual's reaction, is problematical.

Microscopically, one of the most noteworthy features of these chronic miliary and conglomerate tubercles is the extent of the inflammatory reaction about them. The lymphocytes and polymorphonuclear leucocytes are attracted in relatively large numbers, the fibrous tissue cells are engaged in an active proliferative process apparently organizing the fibrin which is usually present in great abundance. Unlike other processes, the repair usually occurs without any evidence of vascular regeneration. The endothelial cells derived from the vessels do not, apparently, make any attempt to form new capillaries, but occlude the vessels, thus preventing further dissemination of the tubercle bacilli. Sometimes the repair is accomplished by fibrous tissue proliferation alone, sometimes by a deposition of calcium in the caseous material, and sometimes actual bone formation may occur by a specialized reaction of the fibroblasts. In the lungs, the repair is most apt to be by the activity of the fibrous tissue cells. In the hilus lymph-nodes, with their loose structure, calcification is more common.

#### *Tuberculous Pneumonia.*

The exudative reaction which has been mentioned is not limited to the actual tubercle in the lung, but extends into the alveoli, forming a definite patch of broncho-pneumonia. This is the second important element in the lesions of the tubercle bacillus in chronic pulmonary tuberculosis—tuberculous broncho-pneumonia.

Varying with the number of foci of infection and with the virulence of the organism, the pneumonic exudate may occupy but a few alveoli, or it may involve one or more entire lobes. It is characterized, microscopically, by the presence of rather abundant amounts of fibrin, serum, and large mononuclear cells of phagocytic capacities. Varying numbers of other inflammatory cells—lymphocytes and polymorphonuclear leucocytes—are usually seen. As the process develops, one of two things may occur. First, the alveolar walls may undergo necrosis from an avascularization by compression or occlusion of the capillaries by the endothelial cells. To this condition the term caseous pneumonia is applied when it occurs to any considerable extent. Or second, proliferation of the connective tissue may occur. This grows into the fibrinous exudate from the alveolar wall and organizes this fibrin. In such a process, large areas of lung may be replaced by connective tissue with resulting deformities. To this condition, when at all extensive, the term "fibroid phthisis" is often applied. Certain of these gross specimens illustrate these two conditions very satisfactorily.

#### *Cavity Formation.*

As the lesions of tuberculosis progress over many months we get the third characteristic condition occurring—that of cavity formation. A histological study of these lesions brings out certain rather fundamental points. In a loose tissue like the lung, when the conglomerate tubercle formation reaches a certain size, almost invariably softening results from its caseous avascular condition. With this softening, polymorphonuclear leucocytes are attracted by the necrotic tissue, and there is an actual abscess formed. This abscess may rupture into a vessel or a bronchus and cause extensive secondary lesions. Often this abscess formation is hastened by some secondary pyogenic organism—*staphylococcus*, *streptococcus*—invading a tubercle.

Dependent upon the number of foci of softening and their approximation to one another, are the size and number of cavities thus formed. They present, grossly, a shaggy, irregularly outlined cavity, usually lined by a fibrinous exudate, and often coursed by trabeculae containing remnants of blood vessels and bronchi. Reparative fibrous tissue proliferation frequently accompanies such cavitation, so that occasionally such a lung may represent actually a less severe clinical picture than a patient whose lung shows a much less extensive process, but whose lesions are of a multiple distribution and progressive in character.

Besides these two forms of pulmonary tuberculosis, there is a third less common lesion occasionally seen. Histologically, this is characterized by a peculiar gelatinous exudate which fills the alveoli. Inflammatory cells are sparsely distributed through such an exudate. It is usually associated with the involvement of one or more lobes, and presents a clinical picture not unlike lobar pneumonia. No very satisfactory explanation of this exudate has been offered.

#### *Pleura.*

The lesions of the pleura are most frequently an extension of the inflammatory process in the peripheral portions of the lung tissue, and exhibit essentially the same characteristics. There is, however, a particularly fibrinous exudate deposited on the surface of the pleura which undergoes repair by the ingrowth of new vascular endothelium and fibroblasts.

#### *Bronchial Lymph-nodes.*

In discussing pulmonary tuberculosis, the importance of the hilus lymph-nodes must not be overlooked. As we mentioned, in speaking of the pathogenesis of tuberculosis, statistics bring out the relative influence of glandular infection. In Ghon and Hedren's series of children, between 93 and 100 per cent. showed both pulmonary and lymph-node involvement, varying slightly with the age of the children. In the Infants' Hospital series, all of the cases which

involved the lung, showed 100% involvement of the hilus nodes.

The lesions here are apt to be diffuse because of the loose stroma of the glands. In their histology, no inherent differences are noted, however. Repair is very often accomplished by calcification.

#### *Tuberculosis Elsewhere.*

I have already exceeded my limited time in this very sketchy account of the pathology of tuberculosis in the lungs. But tuberculosis is by no means limited to the lungs; it is frequently found in almost every organ of the body; it may assume the most bizarre forms and simulate almost any other disease. Most commonly, however, it is found in certain places—the pleural cavity in relation to lesions of the lung—the genito-urinary apparatus, particularly the kidney, ureter, Fallopian tube, endometrium, epididymis and seminal vesicles, the intestinal mucosa, the meninges, the cerebellum, the bones and joints, especially the vertebrae (Pott's Disease) and the hip-joint.

The histology in these cases is essentially the same—an exudative and proliferative reaction to the presence of the tubercle bacillus with the formation of miliary tubercles modified by the architecture of the organ affected. Thus in the cerebellum the solitary tubercle—the end-result of the reaction to a single organism—is seen, and in the colon an extensive ulcerative process is most frequently noted.

#### *Experimental.*

In the experimental field much work has been done. One of the greatest points of contention has always been that of the origin of the so-called "epithelioid" cells. Within the past few years the injection of vital dyes and carbon pigment into animals, followed by inoculation with tubercle bacilli, has led various observers to conclude that the vascular endothelium is the important element in the formation of these cells. In addition to the purely morphological studies, the entire field of serology and immunology is being extensively studied. It is, perhaps, along these lines that the solution of therapeutics may be reached. Too much emphasis cannot be placed upon the importance of continuing these intensive studies, as it is only by such work that we may arrive ultimately at the goal.



#### SERUM TREATMENT OF LOBAR PNEUMONIA.

BY L. W. MCGUIRE, M.D., BOSTON.

THE treatment of Type I lobar pneumonia with Type I anti-pneumococcal serum has proved to be of such definite value that it is desired to enumerate the principal reasons why

favorable results are not always obtained; also to report a series of cases treated with Type I serum.

A large number of physicians are not convinced of the value of the serum treatment of pneumonia. This fact is due to several reasons. (1) They do not employ serum early in the disease; (2) They attempt to treat with serum only what they consider the serious cases; (3) They do not use sufficient serum; (4) They do not type the pneumonia; (5) Some use a so-called "polyvalent serum" and not a specific Type I serum. These factors will now be considered in detail.

I. They do not employ serum early in the disease.

The necessity of using serum early in the disease if the best results are to be obtained has been shown repeatedly in the various groups of cases reported. This was strikingly noted in the series of cases reported from the Pneumonia Service of the Boston City Hospital.<sup>1</sup> They had no mortality in cases treated on the second and third day of the disease. It is particularly dangerous to wait until a patient becomes critically ill and then start serum treatment. The longer the treatment is delayed, the higher will be the mortality.

II. They attempt to treat what they consider only the serious cases.

Physicians who treat only the serious cases of Type I pneumonia with serum cannot hope for success. No physician can tell at what time, a patient only moderately sick with pneumonia, will become critically so. The entire clinical picture may change in a very short time. The only fair way is to treat all cases of Type I with serum in the beginning, whether they are mild or severe.

III. They do not use sufficient serum.

There is no definite limit to the quantity of serum that can be used in a patient who is not sensitive to horse serum; 600 c.c. is the largest amount I have used for one patient. Cole<sup>2</sup> states that up to 1000 c.c. may be necessary, but the amount required in the average case is 200 c.c. or 300 c.c. The usual procedure is to repeat 100 c.c. injections every 8 or 12 hours until recovery takes place. In many cases recovery will promptly follow a single injection of 100 c.c. of serum. In others, the temperature drops to normal in a few hours, then gradually begins to rise. Another injection of serum is then indicated.

Before administering serum it is necessary to determine whether or not the patient is sensitive to horse serum, by carrying out appropriate skin tests. Patients who are sensitive must be desensitized before serum treatment can be carried out with safety.

IV. They do not type the pneumonia.

If serum therapy is to be employed, it is absolutely imperative that all cases of lobar pneumonia be typed. Ordinarily there is sufficient time to send the sputum to the laboratory

and wait for a report, if this is done when the patient is first seen. Only in an exceptionally severe case should serum be given before the type is determined. Such determination takes on the average about 12 hours. Where sputum could not be obtained I have often resorted to lung puncture in the consolidated lung area to obtain a culture of the organism, and I have never seen complications result from such a puncture.

V. Some use a so-called "polyvalent serum" and not a specific Type I serum.

To mention the so-called "polyvalent serum" is to condemn it. There is no excuse for its use. Up to the present time a serum of sufficient potency to be of curative value has not been developed except in Type I; therefore the use of a mixed or polyvalent serum is not warranted.

It is to be remembered that Type I anti-pneumococcal serum is standardized and must have a definite protective power before it is distributed for therapeutic use.<sup>1</sup> The Rockefeller Institute<sup>2</sup> has adopted the standard that .2 c.c. of anti-pneumococcal serum must regularly protect against at least .1 c.c. of a culture which is shown by animal tests to be of proper virulence. The standardization tests are carried out by inoculating mice. So far it has not been possible to produce a serum in the other types of pneumonia which has sufficient protective power to warrant its use.

The following series of 35 cases include all the Type I pneumonia which occurred in my service at the Naval Hospital, Chelsea, Massachusetts, as well as cases treated in private practice since leaving the service.

No. cases, 35; white count average, 26,000.

No. deaths, 2; amount serum average 205 c.c.

Mortality, 5.7%; complications empyema, 2.

Febrile period, average, 66 hrs.

Two deaths occurred. One was due to empyema five weeks after the patient had recovered from pneumonia. This patient responded promptly to serum treatment. His temperature became normal in a few hours following a single injection of serum. In a few days empyema developed, for which a rib was promptly resected. The empyema proved fatal.

The other death occurred in a young man who was admitted to the hospital with all the symptoms and signs of lobar pneumonia. His sputum showed Type I pneumococcus. His throat culture was positive for diphtheria and streptococcus-haemolyticus. He was given diphtheria antitoxin followed by two injections of Type I serum, and apparently recovered, for his temperature, pulse and respiration were normal on the fourth day. On the fifth day his symptoms began to return. He received four more 100 c.c. injections of Type I serum, but did not respond to treatment. An autopsy showed a diffuse broncho-pneumonia of the lower lobes of both lungs, hypostatic pneumonia of right upper and middle lobes, with 150 c.c. of sanguineous

exudate in the right pleural cavity. Whether this patient actually died of Type I pneumonia seems questionable, as the autopsy report showed a broncho and not a lobar involvement.

The normal mortality of Type I pneumonia is 25 to 30%. The mortality in this group of 35 serum-treated cases was 5.7%. In a series of 22 cases of Type II pneumonia in the same class of patients during the same period, there were six deaths, a mortality of 27%, which is about the normal.

In 495 reported cases of type I pneumonia treated with serum there was an average mortality of 10.5%. These included many cases treated late in the disease.

The average duration of the pneumonia in this series of 35 cases as determined by the temperature and symptoms was 66 hours; in other words, the time from the initial chill and fever until the temperature was again normal was less than three days. The course of the disease was thus decidedly shortened. In the majority of the cases the fever ended by crisis. These patients were practically all treated during the first or second day of the disease and none later than the third day.

By itself this series of 35 cases is too small to arrive at definite conclusions, but when taken in conjunction with the other groups of reported cases collected from literature, it furnishes additional evidence of the value of the serum treatment, of type I pneumonia.

#### REFERENCES.

1. Edwin A. Locke, M.D.; Henry M. Thomas, Jr., M.D.; Dwight O'Hara, M.D. Acute Respiratory Infections (From the Pneumonia Service, Boston City Hospital); *Boston Medical and Surgical Journal*, October, 21, 1920.
2. Anti-pneumococcal Serum, *Journal A. M. A.*, January 8, 1921.
3. Freshly bottled serum may always be obtained by writing or telephoning the Department of Public Health, State House, Boston, Massachusetts, or from the Antitoxin and Vaccine Laboratory of the Department of Public Health at 375 South Street, Jamaica Plain, Boston, 34. Major Dr. Benjamin W. H. P.H.D., the director of this laboratory, recommends that the serum used be water clear, free from sediment, and free from any tinge of hemoglobin, and that it be used as soon after its preparation as possible in order that the full potency of the serum may be utilized.
4. Monograph No. 7, Rockefeller Institute of Medical Research.

#### A CASE OF MESENTERIC THROMBOSIS.

BY JOHN G. HENRY, M.D., F.A.C.S., WINCHENDON, MASS.

ALTHOUGH, fortunately, of rare occurrence, mesenteric thrombosis is attended by such a high death rate that it must command the respectful interest of the surgeon.

Writing on this subject in the latest volume of Ochsner's "Surgery," Bottomley says: "Even with early operation, we can expect, I believe, only occasional recoveries. Operation offers the only hope, and that but little. The mortality in unoperated cases must be 100 per cent."

One of my surgical friends, who has had a wide experience in abdominal work, told me recently that he had operated on five cases, all of them fatal.

My personal experience with this condition has, perhaps fortunately for me, been limited to the one case here reported.

Mr. L., a laborer, 66 years old, patient of Dr. A. G. Pelletier, was admitted to Millers River Hospital, July 16, 1920.

He had worked in a hay field the previous day and went to bed in his usual health. About midnight was taken with severe abdominal cramps attended by vomiting.

Quoting from Dr. Pelletier's notes of the case: "I was called to see him about 2.30 A.M. At that time he had general pains in his abdomen, with severe colic of short duration, about once in fifteen minutes. The symptoms seemed to indicate an acute obstruction. A high enema cleared the bowels thoroughly and lessened the pain, but did not stop it entirely. I left the patient at 6 o'clock and returned at 10.30. Upon examination, the pain and tenderness seemed to be located chiefly over McBurney's point. As the abdominal condition strongly suggested appendicitis, I took him to the hospital."

On examining the patient soon after his admission, I found him a very spare man; in fact, his general appearance suggested tuberculosis. His pulse and temperature were normal, he had not vomited for several hours past, had but little pain, and insisted that he felt much better. His heart and lungs seemed normal, but he had some evidence of arterio-sclerosis. His abdomen was somewhat tympanitic, with marked tenderness and muscular rigidity in the right lower quadrant. There was no history of any previous attack.

It was evident that he had some serious abdominal lesion, but I expressed my doubts to Dr. Pelletier about its being a case of appendicitis.

Operation at 3 P.M., thirteen hours after onset, assisted by Dr. Pelletier. On opening the abdomen through a right rectus incision, a black mass came into view which at first glance appeared like an enormous blood-clot, but on examination proved to be a section of ileum, somewhat more than a foot in length, considerably dilated and absolutely black.

Intestinal clamps and rubber tubing were hurriedly sterilized in alcohol, and the clamps applied well to either side of the necrosed gut. A section of ileum, 18 inches in length, was resected and the mesenteric vessels tied off. An end-to-end anastomosis was done by McGrath's method, the operative area sponged out with salt solution, and the abdomen closed with a cigarette drain.

The operation occupied fifty minutes, and the patient was put to bed in fair condition. Salt solution per rectum was given at four-hour intervals for forty-eight hours. The drain was removed on the fifth day. There was no discharge except a little serum. He was given small sips of water on the third day and nothing but liquids for two weeks.

Convalescence was normal, except for a very slight phlebitis which developed just after he began to sit up. He left the hospital August 11, and a few weeks later resumed his usual work, and has been perfectly well since.

### Book Review.

*The Psychoanalytic Study of the Family.* By J. C. FLÜGEL. Pp. 259. London, New York, Vienna: The International Psycho-Analytical Press. 1921.

This third volume in the admirable projected series of the International Psycho-Analytical Library is fully up to the standard of its predecessors. The problems which it discusses are of the greatest importance for a clear comprehension of the neuroses, as recent psychoanalytic investigation has proven that these neuroses arise on the basis of family conflicts dating from early childhood, which may later produce an inability to face the realities of adult life, when these arise as a precipitating factor.

Most of the material contained in this book has already found a place in the literature of psychoanalysis, but the author's contributions in the last few chapters are not only decidedly suggestive, but likewise original and are based upon scientific data of the first portions of the volume. The entire question is admirably treated from the psychological standpoint, while the ethical and sociological considerations are based upon what psychoanalysis has already revealed in the development of the child and its relation to the family during the periods of growth and maturity. Although the volume is clearly written, yet the material accumulated therein will be somewhat difficult to understand for one who is not already familiar with the growth and development of psychoanalysis, particularly within the last few years.

However, it will repay close study, even for the uninitiated, and both the neurologist and the pediatrician will find therein, material of inestimable value, in dealing, respectively, with the neuroses of adult life and the development of the character traits of childhood. Consequently it can be highly recommended, not only because of its sound scientific character, but likewise for the illumination it gives for a true understanding of our mental welfare and progress from the earliest days of childhood.

### IMPORTANT NOTICE.

Announcement of meetings to be held on and after next Thursday should reach the desk of the Editor of the JOURNAL not later than next Saturday before noon. The printers do not work Saturday afternoon and the material is locked up in the forms on Monday, and goes to press Tuesday morning. The wrapping and mailing begins Wednesday. Please forward copy early.

## THE BOSTON Medical and Surgical Journal

Established in 1822

Published by The Massachusetts Medical Society under the jurisdiction of the following-named committee:

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SUBSCRIPTION TERMS: \$6.00 per year in advance, postage paid for the United States, \$7.56 per year for all foreign countries belonging to the Postal Union.

Material for early publication should be received not later than noon on Saturday. Orders for reprints must be sent to the printer with *paying proof* of *reprint*. Upon written request, author will be furnished one hundred gratis reprints, without cover, or the equivalent in paper to articles of greater length.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to The Boston Medical and Surgical Journal, 126 Massachusetts Ave., Boston, Mass.

### THE SITUATION REGARDING THE TRAINING OF NURSES.

DURING the past generation the training of nurses has developed to a remarkable degree. This has been rendered possible by the labors of many devoted women in the rapidly increasing number of hospitals scattered throughout the cities and towns of the whole country. The sick in hospitals are cared for in a remarkably satisfactory manner.

During recent years the demand for graduate nurses in various new lines of work has been tremendous. Public health, school, district, and industrial nursing have absorbed and are still absorbing so many graduates of our training schools as to create a scarcity of nurses who wish to enter private nursing and take care of the ordinary sick individual in a private house. Furthermore, the cost of nursing service has increased tremendously of recent years. This is due, in part, to the laws of supply and demand, in part to the general increase in the cost of living, and last, but not least, to the very general increase in the cost in time and money required to educate a trained nurse. So great has been this increase in the cost of sickness that various remedies have been suggested and attempts have been made in many ways to bring the expense of proper care of the sick within the means of the family of moderate income.

Chief among the measures put into practice is the training of attendants in courses of varying lengths, usually a year or less, who may go out into the communities, capable of caring for ordinary illnesses. They are not intended to compete with trained and registered nurses, but frequently, by taking advantage of the laws of supply and demand, they have in a way competed with registered nurses. Undoubtedly, there is a place in the community for attendants, and undoubtedly, in certain hospitals, it is wise that attendants should be trained. It must, however, be recognized that the satisfactory training of nurses and attendants, side by side, in any hospital, is usually a practical impossibility. Attendants should be trained in one set of institutions, and nurses in another.

While in certain particular cases, these two sets of women may fill the requirements of caring for the sick, is it probable that the real solution of the problem confronting the various communities lies in the training of these two classes? Is it not true that the present methods of training nurses are the outgrowths of attempts to overcome the fundamental objections to trained attendants? Are not our training schools for nurses today due to the recognition of the fact that nursing requires professional standards, that true professional standards cannot be attained in a short time, and that, in many instances, partially trained women will assume undue responsibilities.

Is it not probable, therefore, that the training of attendants is but a partial and at best, a makeshift solution of the problems confronting the communities? Unless a very considerable and increasing proportion of our hospitals deliberately abandon the training of nurses and undertake the training of attendants, the needs of the public cannot be met, and if they are to be met in this manner, is it not inevitable that the deficiencies in the training of attendants will be gradually filled by lengthening of the course, bettering the teaching, and raising the standards? In other words, the training of attendants will represent a second cycle in the training of women to care for the sick. From the standpoint of the public welfare, is this a desirable method of remedying present admitted ills?

Has not the public a right to ask whether there may be ways in which the training of nurses may be so modified as to permit the training of larger numbers at less expense? A shortening of the usual three years' course would automatically accomplish both of these objects. The question is whether this can be done without lowering the professional standards which a nurse should acquire and maintain. It is essential that no such deterioration should be permitted, yet it seems that much time today is devoted to subjects which are of

little value to the ordinary nurse in her work, and a smattering of that which does not really help toward inculcating and maintaining the professional standards which must become second nature. Moreover, many of our smaller hospitals are not really equipped to give three years of instruction to the bright young woman who has learned in two what can be offered her by the school in which she is enrolled. In the larger and better equipped schools and hospitals, the three years of training give much more than is needed for ordinary nursing. Is it not possible, therefore, to cut down the basic training to a period of about two years for the nurse who plans to care for the sick? Would not many bright young women who cannot afford to give three years to this course, welcome the chance to give two years? Would not such a shortening of the course open up opportunities for providing, in certain schools, a third year of training infinitely better than anything now given, for those who wish to enter special lines of work, or to become teachers or executives? In this manner the particularly able and ambitious graduate of a small training school would have the opportunity of post-graduate elective third-year work in a special school. The situation would be exactly comparable to that of the candidates in a college for the bachelor's degree and for the master's degree. There would be no rivalry between distinct classes. A picked group of nurses would simply go on to fit themselves for special work. Naturally, teachers and executives would be chosen from those who had taken advanced courses, just as school teachers are apt to be chosen from those who have taken the extra work requisite for the master's degree. But nothing would prevent the graduate of a two years' course from becoming the head of a training school if she proved fitted for such a position.

It is not practical to undertake to teach nurses in a year and a half enough to have them go out to care for certain types of illness, with the opportunity of coming back at later periods for instruction in other types of nursing. Such a system would be too complicated to be understood and accepted by the public, and too difficult for the ordinary nurse to carry out.

Must not our training schools recognize and meet the public needs? Will not a simplification of the basic training, a shortening of the course from three to approximately two years, supply well-trained women with high and enduring professional standards to go out and care for the sick? Will not the elective third year given in certain schools open the door to a very much higher and better standard of professional training than anything we now have for these nurses intending to undertake other

than private nursing? In this way, cannot nursing be made a better and a finer profession than it has ever been before?

#### THE CONSERVATION OF EYESIGHT.

A work of great importance is being carried on by the Eyesight Conservation Council of America, Inc. The aim of the Council is obvious; it seeks to accomplish its purpose, first, by arousing the interest of teachers and parents in the vision of the children under their care, and, second, by promoting measures for conserving eyesight in industry.

Pamphlets are being distributed to teachers and to parents, asking them to watch for evidences of defective vision or of eyestrain in the children. Teachers may secure from the Council a vision chart, by means of which many of the more obvious defects of vision can be detected. A study of eye conservation in industry has been carried out as a part of the study of waste in industry.\* The report of this study, written by Dr. Earle B. Fowler, contains some very interesting figures in regard to the saving in eyes which has been accomplished through the use of protective devices, such as goggles. The number of industrial blind in the United States is approximately 15,000; of this number, a large percentage, in all probability, might still have their vision, if certain protective devices now in use had been employed in the beginning. The American Car & Foundry Company, for example, has found that the use of goggles has reduced accidents in their plant 75 per cent. The chief dangers are from flying objects, from dust and small particles, from dust and wind, from splashing metals, from gases, fumes and liquids, and from reflected glare and radiant energy, such as is met with in oxy-acetylene welding.

Another contact between eyesight and waste has been discovered in the effect of defective vision upon output. Defective eyes become more easily fatigued under poor conditions of lighting; the eyestrain causes nerve trauma and, consequently, diminished ability to work. The truth of this theory has been so firmly established that a number of large industrial concerns now employ an oculist to test the vision of all their operatives, and supply glasses when necessary.

Closely related to the correction of vision in employees is the provision for proper illumination. The science of industrial lighting is based upon three requirements: (1) Light enough to see by to do work—too little or too much producing discomfort; (2) diffusion to avoid sharp contrasts and deep shadows; (3)

\*A copy of this report may be obtained by sending 25 cents to the Eye Sight Conservation Council, Times Building, New York City.

elimination of glare. That these requirements are not in universal use is shown by a survey of 446 plants, showing that the light conditions were excellent in 8.7 per cent., good in 32 per cent. The rest were fair, poor, or very poor.

Apparently there is much need for the efforts of the Eyesight Conservation Council, and much benefit to be secured by the carrying out of their recommendations.

#### CAMPAIGN AGAINST ILLEGAL PRACTITIONERS.

STIMULATED by the New York County Medical Society, the District Attorney has promised coöperation in a movement designed to prevent unregistered persons from practising medicine. Although New York has a very good law regulating practice, the irregulars have flourished because of lack of interest on the part of the prosecuting officers. The activity now in progress was inaugurated because of deaths of patients under chiropractic treatment. Chiropractics have appeared to have considerable political influence, and a recent amendment to a bill now before the legislature was presented which would, if enacted, exempt chiropractors. New York physicians are alive to the situation, but the chiropractics seem to have the democratic leader of the Senate with them. The result will be watched for with interest.

#### NEWS ITEMS.

**THE WORCESTER DISTRICT MEDICAL SOCIETY.**—The City of Worcester has reason to be proud of its latest addition to its group of buildings known as Belmont Hospital, formerly called the Worcester Isolation Hospital.

The first building, now used for administration purposes, was erected, near the top of Belmont Hill in 1896, and at that time was one of the first hospital buildings to be erected by a municipality for the exclusive care of contagious diseases. Later, three wooden wings were added to the central building, and for years scarlet fever and diphtheria were the only cases admitted. In 1915, the city built, on the top of Belmont Hill, the Putnam Ward for the care of pulmonary tuberculosis. The ward, while some distance from the other wards, was connected with them and the administration building by a subway, and is heated by the same heating plant and is served from the same kitchen.

February 9, 1922, the latest addition to this group was opened for the inspection of the City Council and heads of departments. The new building has been named the Coffey Ward, in honor of the late James C. Coffey, who for twenty-five years was executive officer of the

Worcester Board of Health and under whose able leadership this hospital has grown to its present size. The Coffey Ward is a substantial brick structure of three stories, costing about \$177,000. It is connected with the rest of the group by a commodious subway, heated from the central heating plant, and served from the same kitchen, the food for all of the wards being carried through the subway on an electric truck. The first floor of the Coffey Ward has a large nurses' robing room, with the latest plumbing for sterilizing the hands after visiting the wards; a physicians' robing room, visitors' robing room, receiving ward, discharge bathroom, patients' clothing room, and a special ward of six beds for special cases, including smallpox if necessary. The second floor has four three-bed wards and twelve private rooms for mixed infections; with linen rooms, two bathrooms, utility rooms, diet kitchen and two spacious screened piazzas looking towards the west. The windows in the private rooms and wards are built in the form of French doors, so that the beds can be rolled out onto the piazzas. The third floor has two twelve-bed wards, with baths, linen closets, etc. Each ward has thirteen windows and open onto large piazzas. The floors are of cork blocks, which are noiseless and serviceable. So far as the writer knows, this is the best and most modern building to be devoted to the care of chickenpox, measles, German measles, mumps, whooping-cough, smallpox, scarlet fever and diphtheria yet to be erected. As the group of buildings now stand, the three old wards will accommodate thirty patients each, the Putnam Ward will accommodate fifty-five patients, and the new Coffey Ward sixty-eight patients, making a total of two hundred and thirteen patients, which ought to be sufficient for some time. Belmont Hospital is conducted by the Board of Health as a part of its activities, with Dr. Edward H. Trowbridge, chairman, and George C. Hunt and John F. J. Herbert as members. Dr. May S. Holmes has been its superintendent since its opening. Dr. Albert C. Getchell is visiting physician to the Putnam Ward, and Dr. Charles B. Stevens, chief of staff for the rest of the Hospital.

**BEQUEST TO THE SHARON SANATORIUM.**—Under the will of Mrs. E. Florence Brett of Brockton, \$5,000 has been left for the Endowment Fund of the Sharon Sanatorium.

**THE MONTHLY BULLETIN, PUBLISHED BY THE MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE.**—This publication is an important link in the chain of efforts toward preventive health measures, and should be read by everybody. The editor is George K. Pratt, M.D. The Society office is 1132 Kimball Building, 18 Tremont Street, Boston.

**HARVARD MEDICAL SCHOOL RESEARCH CLUB.**—A meeting was held on Friday, March 17th, at 12.30 o'clock, and was addressed by Professor W. M. Bayliss, F.R.S., University College, London, on "Ringer's Solution and Substitutes for Blood."

**HARVARD MEDICAL SOCIETY.**—A meeting was held in the Peter Bent Brigham Hospital, Tuesday evening, March 14. Dr. Francis W. Peabody spoke on "Medicine in China."

DURING the week ending March 11, 1922, the number of deaths reported was 298 against 229 last year, with a rate of 20.34. There were 43 deaths under one year of age against 38 last year.

The number of cases of principal reportable diseases were: Diphtheria, 70; scarlet fever, 53; measles, 149; whooping-cough, 16; typhoid fever, 2; tuberculosis, 41.

Included in the above were the following cases of non-residents: Diphtheria, 8; scarlet fever, 6; measles, 2; whooping-cough, 1; tuberculosis, 1.

Total deaths from these diseases were: Diphtheria, 2; measles, 2; whooping-cough, 1; tuberculosis, 19.

Included in the above were the following cases of non-residents: Diphtheria, 1; tuberculosis, 1.

**APPOINTMENT TO MEMBERSHIP OF BOARD OF REGISTRATION IN MEDICINE.**—Dr. George Herbert Jones of Westfield was nominated by Governor Cox to fill the vacancy on the Board of Registration in Medicine. On Wednesday, March 8th, the Council confirmed the action of the Governor.

Dr. Jones is a member of the Massachusetts Medical Society and has occupied a prominent position in medical activities in the western part of the State.

**THE SPRINGFIELD ACADEMY OF MEDICINE.**—Tentative arrangements have been made with Dr. William Kirkham, formerly instructor in biology at Yale, to give a series of three lectures in the Academy rooms during April, on "Evolutionary Changes in the Human Body and Their Practical Significance." The plan will be consummated if enough interest be shown.

The next meeting comes April 11th, and is the annual meeting.

**GRANTS FOR RESEARCH MADE BY THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF**

**SCIENCE.**—The Committee on Grants held its annual meeting in New York on January 1, 1922, and distributed four thousand dollars which was assigned by the Council of the Association for the current year. Three members of the committee, Messrs. Crew, Parker and Stebbins, having retired at the end of 1921, the present organization of the committee is: Robert M. Yerkes, Chairman; F. R. Moulton, Secretary; E. G. Conklin, C. Judson Herrick, Arthur B. Lamb, George T. Moore, E. L. Nichols, and David White.

Among the grants distributed, several were to workers in medical fields, as follows:

One hundred and fifty dollars to Professor F. C. Blake, Ohio State University, for partial payment toward the cost of an x-ray spectrometer; two hundred and fifty dollars to Dr. A. W. Rowe, Evans Memorial Hospital, Boston, for the study of the basal metabolic rate in pregnancy; one hundred dollars to Professor W. C. Rose, School of Medicine, University of Texas, in support of a study of blood changes in nephritis; two hundred dollars to Professor Fred T. Rogers, Baylor Medical College, for a study of the marsupial brain; two hundred dollars to Professor Frank P. Knowlton, Syracuse University, in further support of the study of the blood flow and gaseous metabolism of the thyroid gland; one hundred and fifty dollars to Professor Frank A. Hartman, University of Buffalo, to aid in the further study of suprarenal insufficiency.

**X-RAY ROOM AT LYNN HOSPITAL.**—The Lynn Hospital has installed an x-ray outfit of the latest design to replace the old equipment. The accommodations for this class of patients is ample. Last year there were 1,240 cases in the hospital requiring x-ray treatment or investigation. Dr. Ester Sunderlof, a graduate of Tufts College Medical School, is in charge.

**COURT DECISION ON QUARANTINE OF VENEREAL DISEASES.**—In the *habeas corpus* proceedings brought before him, the Chief Justice of the Supreme Court of Montana has decided that a person, who was detained by order of a health officer because reasonably suspected of being venereally infected, was not entitled to a judicial hearing prior to the time of taking and detention.

Dr. JAMES H. MEANS of Boston will speak before the New York Academy of Medicine (Medical Section) March 21, 1922, at 8.30, on "Clinical Types of Acidosis, with Reference to Their Symptoms and Treatment."

## Reports of Societies.

### THE 36TH ANNUAL MEETING OF THE INSTRUCTIVE DISTRICT NURSING ASSOCIATION HELD AT THE HOTEL VENDOME, THURSDAY, FEBRUARY 23, AT 3.30 P.M.

OFFICERS elected for the coming year: Mrs. Ernest Amory Codman, President; Miss Gertrude W. Peabody and Mrs. Robert L. DeNormandie, Vice-Presidents; Miss Emily G. Denny, Secretary; Mr. Ingersoll Bowditch, Treasurer. The board of managers was confirmed in office.

Mrs. Codman, who presided, reviewed the year's work and introduced the other speakers: Miss Annie Hervey Strong, Director of the School of Public Health Nursing, for which the Association and Simmons College are jointly responsible, spoke of the work of the school. The Helen Homans Memorial Nurse, Miss Agnes V. Murphy, Supervisor of the Hyde Park Health Center, described the Center and its activities. Miss Miriam A. Ames, Maternity Supervisor, spoke in some detail of the maternity work.

Mr. Ingersoll Bowditch, Treasurer, reported that the expenses for the year were \$227,964.37; income, \$218,182.64; the deficit of \$9,781.73 being met from the unrestricted fund.

Because of the excessive pressure of nursing work, only a few of the nurses were present. Under normal conditions, the full staff attends the annual meetings.

Mrs. Codman paid a high tribute to Miss Mary Beard who, after nearly ten years of devoted and effective service, resigned her position of Director last fall, to take a long rest.

The work of the Association is being carried temporarily by the Board of Managers and the Chief of Staff and her assistant, in the hopes that Miss Beard may accept the invitation of the Board to return to take up her position in October.

Mrs. Codman called attention to the report of Miss Murphy, Supervisor of the Hyde Park Health Center, where the generalized nursing policy of the Association is being more fully developed by the addition of Baby and Child Health work.

The results of this experiment of allowing one nurse to take care of sick and well babies, under the supervision of specialized supervisors, are particularly interesting—the death rate of children under one year being 11 per 1000, compared to the city death rate of 77 per 1000. The same experiment tried in Brighton has a record of no deaths.

It is interesting to find that the trend of public opinion seems to be in favor of this method of public health nursing. Professor

Winslow of New Haven, Chairman of the Rockefeller Committee to Investigate Nursing Training, at a recent meeting held in Boston, stated his belief in this form of nursing, and quoted the figures of the results of the New Haven Health Unit, where generalized nursing is being done, while the rest of the city is being nursed by several groups of specialized nurses. Twenty per cent. more work is done in the unit, and one-sixth of the nurses of the city do one-fifth the work.

The next development that the I. D. N. A. is planning along these lines is to add to the group of specially trained supervisors an orthopedic supervisor and a mental hygiene supervisor.

As evidence of the good-will of doctors of the community, it is encouraging to find that 600 private doctors have called upon the services of the nurses, which seems to prove that the nurses are an essential help in their practice.

*Report of the Work of the Year of 1921, read by Mrs. Codman.* There were 288,086 visits made to 34,805 patients—1,855 fewer patients than in 1920. Considering the exceptionally fine health conditions which existed throughout the entire country during 1921, this is a very small decrease and would have been much greater had there not been a good increase in the other branches of our work affected less, or not at all, by the general health conditions.

To carry this work, we had 123 nurses.

#### ACUTE COMMUNICABLE AND CHRONIC DISEASES.

*Decrease.* The acute and communicable diseases, which were more than 58 per cent. of the entire work in 1920, dropped to 38 per cent. of the work of this year. There was a decrease in all of these diseases, more pronounced in influenza, which dropped from 2,307 cases in 1920 to 268 in 1921; pneumonia, from 1,463 to 913; bronchitis, from 1,303 to 908. There were also fewer cases of measles, whooping-cough, chicken-pox, and mumps—1,797 falling to 903 cases. This decrease in the number of patients was accompanied by a very much lower death rate than that of the previous year.

*Slight Increase.* Accidents, i.e., burns, traumas, fractures, etc., slightly increased this year; also diseases of digestion and of the skin. A slight general increase in the chronic diseases included: cancer, 257 to 297 cases; diseases of the heart, 325 to 392 cases.

#### MATERNITY WORK.

The maternity work increased from 23 per cent. to 40 per cent. of the entire work of this year. This is very encouraging, as there were very few, if any, more births in Boston this

year, and the increase can only mean that a knowledge of our work has extended to still more homes where it is needed. About 30 per cent. of Boston-born babies now come under the care of the district nurses. The maternal death rate of this year of 2.8 per 1,000 cases, while slightly higher than last year, is very creditable as compared with the rate for the city as a whole—7.5 per 1,000 cases.

The principal increase in maternity work has been among the cases admitted during pregnancy. To 5,171 of these pregnant women, 32,784 visits were made. The stillbirth rate, which was 35 per 1,000 in 1920—an alarmingly high figure—has dropped to 30 this year. While this is encouraging, the rate is much higher than our former experience with prenatal work has taught us to look for. The infant mortality under two weeks is 21.3 per 1,000 as against 13.3 of last year; this is the highest rate for several years. These stillbirths and infant deaths have been carefully studied, with no resulting explanation of the increased number. It is generally felt that the poor economic conditions of the past year have affected these rates, but no real explanation has resulted from this study.

There was a slight increase in the number of deliveries attended this year. The infant mortality for these cases was only 17 per 1,000, under two weeks.

#### WELL-BABY AND WELL-CHILD WORK.

The result of the care of the babies registered at the three Baby Health Clinics in Brighton and Hyde Park has been the most remarkable feature of the entire work of this year. For infants under one year, the death rate dropped from 12.2 per 1,000 in 1920,—a very fine rate—to 5.3 this year, against a rate for the entire city of 77.8.

The Child Health Clinic, started in Hyde Park, February 8th, will be described by the Hyde Park Supervisor.

#### FEES.

The patients paying the full fee of 75 cents, and those paying part, have each dropped from 11 per cent. to 10 per cent. of the whole number of patients. Those paying no fee remain 48 per cent. This latter figure includes those patients for whom preventive work is done, for which no fee is asked.

Detailed report of the Hyde Park Health Center and of the maternity work, by Miss Agnes V. Murphy and Miss Ames, follows:

Much attention and interest at this particular time is being directed toward the two health centers of the Association, of which Hyde Park is one. The history of the growth

of the Health Center at Hyde Park is most interesting, and the steps of its development mark a progress in health work in response to the needs of the community. From one nurse, a little over eight years ago, the work has steadily grown to require a staff of twelve nurses who, through the various activities connected with the Center, cared for 3,875 patients in the year 1921. The development of each new service, in addition to the work already established, has rounded out the plan for family health work and has made it possible to give and demonstrate the value of continuous nursing in the families we visit.

**Hyde Park District.** To have a good understanding of the application of the work, it is necessary to have in your minds a fairly clear picture of the district. Geographically, Hyde Park is situated on the outskirts of the city, touching Milton and Dedham, and while certain sections of the district are quite congested, other parts present some rural aspects. The population, numbering 24,000 inhabitants, is largely American, with other nationalities, as Polish and Italian, in small proportions. Various types of industries are represented. The district, which is a bit isolated by reason of distance and transportation from the city proper, presents, to a certain degree, the problems of a typical small New England town.

The location of the Health Center is quite central to all the sections of the district. It occupies quarters in one of the business blocks on the main avenue, and from this Center radiates the health work carried on by our Association in the families of Hyde Park. In the arrangement of the work, Hyde Park is subdivided, so that each nurse working in the field has her own particular district where she becomes a known figure to the families of that section, ready always to give care or health instructions wherever and whatever the need may be.

**Types of Work.** The nursing work done in Hyde Park is different from that of the other districts of the Association, only in that through the various activities of the Center, the nurse visiting in the home can reach more families in the district and can preserve in the families a continuity of service that is frequently broken in the other districts where other nurses must enter the home to give special service, as happens, of course, where specialized nursing work is being done. In addition to this, there is a very distinct opportunity to do real educational health work, and this is being carried on in both the homes and at the Health Center, by the nurses of the staff.

**Nursing.** The general nursing work, with which all are more or less familiar, and with which the work in Hyde Park began, still con-

tinues to be a very important phase of the work there today. This service, under the direction of 30 physicians, for whom we nurse, might include care to a mother and new baby, to a pneumonia or a cancer case; in short, to any acute or chronic patient. It is carried on the same basis in Hyde Park as in any other district of the Association, and here, too, we not only care for the sick, but try, by our teaching, to maintain standards of health and to prevent sickness.

**Prenatal.** The value of prenatal care, a form of nursing also begun in the early days, cannot be overestimated. Regular visits to expectant mothers, of whom, last year, in Hyde Park, we had 294, were made under the direction of clinic physicians, to teach them how to keep well and prepare for the babies, to detect by careful observation and urinalysis abnormal symptoms, to be ready to give the right advice at the right time. Such care and instructions have helped to reduce maternal deaths among the patients to *none* for 1921, while for the city, 7.5 out of every 1,000 mothers died.

**Maternity.** Through a gift of \$3,300 from the Metropolitan Chapter of the Red Cross, in 1920, maternity nursing service or care at the time of confinement was established. This makes it possible for every mother in Hyde Park to have, not only care before and after the baby is born, but enables her to have expert care when the baby is born, a service which is not only a distinct benefit to the mothers, but an advantage to the physician as well. To do this work, two nurses are on call alternately, day and night. These nurses, when not on maternity cases, during the day, are doing generalized nursing in their own districts, within call of the station. The value and importance of this service is to be explained more fully later.

**Baby Health Clinics.** We have been able to care for the mother before the baby came, at the time of birth, and afterwards, and now, as soon as the baby is old enough, the mother is urged to bring him to the Baby Health Clinic, which admits any child up to two years. Here, under the advice of the two pediatricians, who are present at the weekly conferences held at the Center, and who are assisted by a nurse from the staff, the mothers are guided along the ways of keeping their babies well, and are helped to lay firmly in these tiny beings, the foundations for future healthy citizens. The visits to the Clinic are followed in the homes by the nurses, who visit, at regular intervals, to carry out directions of the Clinic physician and to further instruct the mothers in the proper care of their babies. As this Clinic is

only for well babies, in case of sickness the baby is referred to the family physician for care and treatment. The comparison of the infant mortality figures of the city, which in 1921, for babies under one year, was 77 deaths out of every 1,000, and those of the registered babies at the Hyde Park Clinic, which was 11 out of every 1,000, in itself speaks for the effectiveness and necessity of this work.

**Child Health Clinic.** No less worth while is the Child Health Clinic, which admits children from two to fourteen years. When the baby graduates from the Baby Health Clinic, our instruction and supervision do not have to cease, for he can enroll in this Clinic. While this Clinic is not as old as the Baby Health, already, through it, many defects often unnoticed by the parents, have been detected, and much corrective work, which is usually slow, has been accomplished. In examination of 370 children, only 24 were found free from defects; average, two to three defects; 104 were found to have tonsils and adenoids (36 have been operated on); 105 were found to have dental caries, and work for about 45 per cent. of these children has been started or finished. Each child receives a thorough examination when enrolled in the Clinic, and recommendations for the correction of these defects are made by the examining physician. Always, the child is referred to his family physician or to a clinic, if treatment is necessary. These children are visited regularly in the homes, by the nurses, until the defects are corrected, and then less often, but at regular intervals, to continue supervision. Through these channels, there is a vast opportunity to do constructive health work. The many postural and nutritional defects have made the establishment of Nutrition and Posture Clinic at this time almost a crying need. The material is ready and at hand, in the children who need this particular instruction to help them correct their faulty diet and health habits and poor posture. Through group instruction, much could be accomplished by way of stimulating the interest and the spirit of competition in these children who, even now, without much invitation, are eager and enthusiastic. With a view towards doing as thorough and effective work as possible, it is our firm hope that these classes may soon be started in connection with this Clinic. Coöperation of parents and children alike has been most encouraging, and although the Clinic is just a year old, the total registration is 375 to date.

**Dental.** The Dental Clinic, established in 1918, as a result of a demonstration carried out by our Association in connection with the public schools, is still being conducted two days a week, treating, on an average, fourteen pa-

tients a day. Although all the families we visit are not eligible to this Clinic, as the system does not admit families whose income exceeds \$6.00 per capita, there is a great need for dental work, more than we are able to give on our present schedule. Through the Child Health Clinic and our work in the homes, we are reaching a few pre-school children, and it is our intention to emphasize this pre-school work more and more, as we realize and appreciate that it is with these children that our opportunity to stress preventive dentistry lies.

*Hourly Nursing.* Hyde Park also offers the community an hourly nursing service, which means that to people desiring a nurse at a special hour, or for a stated length of time, this service can be arranged on a fee basis that would make this branch of work self-supporting.

*Infantile Paralysis.* Special exercises and treatment for these children are given every other week at the station by one of the nurses of the Association, especially trained for this work. These classes enable her to reach more children, and through them, the parents receive a certain stimulation and encouragement which they much need in the long treatment of this affliction.

The activities of the Center and the work in the homes are very closely allied, and it is a plan to have nurses in the field regularly assist in turn at the Clinics, in order that they may become acquainted with the methods of the Clinic physician, to confer with him if they wish, about any special difficulty, and in order, also, that they may occasionally meet their own families at the Clinics. Assistance at these clinics is also given by volunteers, mostly from the Hyde Park Local Committee, which at all times has given much real support and has done much to stimulate the interest of the community. In visiting the home, the nurse may have in one family, baby John, registered at the Baby Health Clinic; Mary and Billy, two youngsters who are patients at the Child Health Clinic and who, with brother Joseph, are connected with the Dental Clinic; the mother may be receiving prenatal care and instruction; if there is illness, the nurse stands ready, under the family physician's direction, to give that care, too, so that in a true sense, her capacity is one of nurse and teacher. Lectures for the nurses, by the Clinic physician, on subjects relative to the work done through the clinics, and by the dietitians from the Dietetic Bureau, have been given in the station, so that better informed and armed, with the opportunities before them, the nurses may continue to do through a continuous nursing service, real constructive health and educational work in the families, and by so doing, raise and maintain standards of health in the community at large.

## FIRST MEETING OF THE ADVISORY HEALTH COMMITTEE OF THE NEW ENGLAND DIVISION, AMERICAN RED CROSS, AT THE HOTEL VICTORIA, BOSTON, MASS., FEBRUARY 28, 1922.

Present: Of the Committee, Dr. Charles Macle Campbell, Director of the Psychopathic Hospital of Boston and President of the Massachusetts Mental Hygiene Society; Dr. Charles F. Dalton, Secretary, Vermont State Board of Health; Dr. Eugene R. Kelley, Commissioner of Public Health of Massachusetts and President of the State and Provincial Health Officers' Association; Dr. Clarence F. Kendall, Commissioner, Maine State Department of Health; Dr. William Rice, Dean of Tufts College Dental School, President of the Dental Hygiene Council, and Vice-President of the Massachusetts Dental Society; Dr. B. M. Richards, Secretary, Rhode Island State Board of Health; Miss Anne H. Strong, Director, School of Public Health Nursing of Simmons College; also Arthur G. Rotch, Manager, New England Division, American Red Cross; Cheney C. Jones, Assistant Manager, New England Division, American Red Cross; Miss Katherine McMahon, Consultant in Health Work, New England Division, American Red Cross; Miss Mary K. Nelson, Director of Nursing, New England Division, American Red Cross; Earl F. Gates, Director of Public Information, New England Division, American Red Cross; Dr. John T. Black, Commissioner of Health, Connecticut.

Absent: Of the Committee, Dr. Charles Duncan, Secretary, New Hampshire State Board of Health; Dr. David L. Edsall, Dean of Harvard University Medical School; Dr. Walter P. Bowers, Editor, *Boston Medical and Surgical Journal*.

The meeting was a luncheon meeting with Mr. Rotch the host. It continued from 1:15 p. m. to 3:15 p. m.

Mr. Rotch outlined briefly the American Red Cross organization. He stated that the organization has a national headquarters in Washington and Division offices, which are, in effect, branches of national headquarters, having supervision over groups of states, the New England Division consisting of the New England States, except Connecticut; that the Chapters form the body of the Red Cross organization. Some of the Chapters, he explained, are County Chapters, having an entire county for their jurisdiction, with Branches in the cities and towns; other Chapters have one community. The National Organization, through the Divisions, exercises control in two respects: funds and standards. It has the right to say that Red Cross funds shall not be spent for purposes not in accordance with the Red Cross program, and that certain standards shall be maintained. Otherwise its work is advisory. It does not say to a Chapter that it must do a certain piece of work, except in connection with Home Service for disabled men. The Division headquarters has a staff of experts on the various Red Cross services who advise and assist the Chapters and their Branches. He stated that about one million dollars was raised in the recent Roll Call in New England, the greater part of which remains in New England.

Mr. Jones briefly outlined some of the work of the Littleton, N. H., Chapter, to illustrate the sort of health activities carried on by Chapters. This Chapter has had public health nursing the past three years, including school and district nursing. He spoke of two features: The owner of the motion picture theatre is interested in the work. He invited the class in home hygiene and care of the sick to hold its graduation exercises in his theatre. He ran a film illustrative of this instruction, the class was presented with the certificates, and a ten-minute talk was given, with 575 people present. Discussing another phase of the work, he said a surprising number of cases were discovered of children who needed correctional treatment. Through Chapter activity, one boy, with a nail in his lung, was taken to Boston, where a remarkable operation was performed without the use of surgical knives. In another case, a girl, unable to use her legs because of infantile paralysis, was given treatment and is now able to walk. Such cases, he said, are too generally accepted as inevitable facts, and no effort to remedy conditions made. There are many things that can be corrected, he said; the people are stirred up, they need help and guidance such as members of the Committee can give.

Mr. Rotch read the statement of Red Cross policy in health work as formulated by a Committee of Division Managers at a recent conference in Washington.

Miss McMahon presented an outline of all the health activities in the New England Division territory, under Red Cross auspices. Her outline was based on a tabulation, a copy of which is attached. (See page 404.)

In addition, she called attention to work in first aid and life saving. First aid is organized among such groups as railroad workers, postal clerks, and industrial workers. The standards have been carefully worked out. In water life saving, she stated that 2,000 have taken the examinations and have received certificates.

She outlined three fundamental ideas underlying the health work: (1) It should have variation—be flexible and adaptable to local needs; (2) it should fill in gaps in health work; (3) it should have the element of temporary service, provide for taking the next step in developing an all-round community health program. The technical help of the Committee is needed in taking the next step wisely.

For a definite problem for the consideration of the Committee, Miss McMahon presented dental work. What is the best way to do it? What are the difficulties? What are the mistakes easily made and to be avoided?

She presented the Middleboro, Mass., Chapter, in illustration. Middleboro is the Chapter city, with Branches in three towns—Carver,

Rochester, Lakeville. There are some 1200 school children in Middleboro, 500 in the towns. The Chapter has money. It is interested in spending it in dental work.

If the farmer wants a cow, he buys it, she said. Why does he not buy dentistry? The opposite of selling dentistry is to bring it in free. What is there between the extremes, until "the farmer realizes his need"?

Dr. Rice opened the discussion. He said the people should be encouraged to establish the habit of caring for their teeth. Little consideration is given the subject. They need encouragement and information regarding the relation of the condition of the teeth to general health. He believes the dentists are in favor of free clinics. They generally encourage it. He believes such activity will meet no opposition among dentists. Such activity is needed in every community, particularly in rural districts. He can see no objection to the Red Cross taking up this work.

He said the Hygiene Council is preparing a new list of equipment for a dental clinic at the request of the Massachusetts Department of Public Health and, when completed, this can probably be made available to the Red Cross and to the other state health departments.

Mr. Rotch stated that in general the Red Cross has operated dental clinics in towns where there are no dentists, and spoke of the traveling dental clinic in Hampshire County, which has met no opposition.

Dr. Kelley said there were two or three problems; for instance, how to work out a general health program, how far the local attitude is to be considered. He said his department would be guided by the Dental Hygiene Council as to what the functions of a dental clinic are. There is the question whether they are curative or preventive. He said he would have to settle the problem sooner or later, so far as the State Department is concerned. He said the Department dental officer (Dr. Schmidt), the officer in charge of child welfare (Dr. Champion), and the Red Cross field representatives were not in agreement.

We will probably have to get back to home rule, he said, find out what the people want, and try it out. The dental question is interesting, but he sometimes wished the dental profession were not ready to go so fast. The medical attitude is one of suspicion that there is infringement on the curative side. The dentists as a whole have more work than they can do, so the more clinic work there is the better, as it does not interfere with the welfare of the dentists. There is a large field for preventive work in oral hygiene in all the New England states. The traveling clinic is not the solution—they are more nearly standing clinics.

Dr. Dalton told of a year's work in Vermont,

financed by private donation. Only children between six and twelve years were taken, and a clean-up job was done on each. It was very successful. The money gave out. All the work was free. There was no investigation of the applicant. Permission of the parents was secured. The clinics were in rural towns. The average work was two extractions and seven fillings per child. The children took to it. He expressed belief that a dental clinic should be free, if possible, and it should be definitely decided who should and who should not have free treatment.

Dr. Kendall said he did not see the Red Cross running into danger in this work. He said a dental bureau has not been established in his department. It is a question whether to charge a fee or have treatment free.

Dr. Richards thought it would be better for the Red Cross to establish work in a community rather than conduct a traveling clinic. He described a clinic he established some years ago in Pawtucket, which is continuing now as a Red Cross activity.

Many go to their own dentists, he said, as the result of services they have received at a clinic. (This statement met with approval.)

Dr. Kelley said that hitherto clinic work has been haphazard. What is its relation to the future? We should see it move towards something permanent. He questioned whether the clinic in Pawtucket should not have been taken over by the city.

Dr. Richards said he thought it would have been as well if the city had taken it. He said he advised a health center in Pawtucket to take over all the welfare services, but emphasized the belief that no one organization should run it. The plan got away from him, however, and it all went to the Red Cross. He has no fault to find with the way it is run, but believes it would be better to have it a Pawtucket health center and accept gratefully all help offered. We should see the taxpayers tied to it, he said.

Mr. Rotch: We advised against it. It is the only one in the Division like it.

Mr. Jones spoke of the Nashua, N. H., community council, made up of two representatives of each organization. The Chapter Executive Secretary is loaned to the council. It has not gone as fast as the center in Pawtucket, but he thinks it is safer.

Mr. Rotch stated he would send the Committee a statement on the Red Cross Nursing Service for consideration and discussion at the next meeting.

Miss McMahon suggested that it would be valuable if the Division Field representatives should receive counsel from the Dental Hygiene Council in working out the technical problems involved in establishing dental clin-

ics, and Dr. Rice responded in favor of such a plan.

Dr. Campbell, on request, spoke on Mental Hygiene. How far the Red Cross is looking forward to entering this field, he stated, is not for me to say. All Red Cross workers, whatever they are doing, come into situations in which they are asked about family affairs, the morality, waywardness, etc., of the child. That is preventive medicine. It is not time for clinics in sparsely settled places, but wherever there are groups, as in schools, some sort of interest in mental equipment should be created. He spoke of the difficulty of looking after the child in the poorer homes. He mentioned tantrums, food, sleep, sex habits, as problems presented in the child. Information about such problems is available. It is comparatively simple. Consciousness among doctors and nurses that there are these mental health problems is lacking. If we do not pay attention to mental hygiene we cripple educational work in physical hygiene. He said it would be possible to have, at an early date, a program for putting fundamental factors before teachers and principals, and the nurse should have special instruction if she is to work with children.

Dr. Black, on invitation, outlined the plans and the program for the regional health institute, to be held in Hartford, Conn., May 1 to 6, with the backing of the United States Public Health Service and the New England States. All the States and the Harvard and Yale Medical Schools have joined in the program: It will be, not a conference, not a convention, but a school. There will be 12 courses: Public Health Administration; Preventable Diseases; Sanitation and Sanitary Engineering; Tuberculosis; Venereal Diseases; Child Hygiene; Public Health Nursing; Social Work; Mental Hygiene; Industrial Hygiene and Accident Prevention; Sanitary Control of Food; Nutrition. Men, eminent nationally and in their own states, will deliver addresses. There will be lectures from Monday to Friday, and field trips on Saturday. There will be no tuition fees. Tuesday will be health officers' day; Wednesday, physicians' day; Thursday, nurses' day; Friday, a general program.

A suggested procedure for securing the support and cooperation of the local physicians for a Public Health Nursing Service was submitted.

*I. Representation on Committee.* The local health officer and a physician should be members of the Nursing Activities Committee or of the Executive Committee where there is no N. A. C. Neither one, however, should be Chairman. In order that the doctor should represent the medical men of the Chapter's

jurisdiction, it would be well to ask the Medical Society or, where there is no Medical Society, the physicians as a group, to nominate some doctor of their own choice to act as their representative in the Chapter.

The health officer on the committee would serve the following purposes:

1. To secure for the Public Health Nursing Service the approval and backing of the local health authority.

2. To provide mutual information, understanding and sympathy.

3. To strengthen and supplement the work of both the health officer and the nurse, through coöperation.

4. To secure the greatest measure of mutual usefulness through compatibility of plans of work.

The physician on the committee would serve the following purposes:

1. To advise the committee and the nurse on ethical and technical principles and problems.

2. To be the connecting link between the nursing service and the doctors.

3. To take up with the doctors all matters needing their approval, advice, or assistance.

4. To interpret the Public Health Nursing Service to them and to assist in building up better understanding.

*II. Procedure.* Early in the process of establishing a Chapter Public Health Nursing Service, the health officer and a doctor nominated as above, should be made members of the committee. Soon thereafter, the medical member of the committee might place before the Medical Society, or the doctors as a group, the ethical principles recognized by the Chapter as governing the Public Health Nursing Service, and might seek their advice and approval of certain practical procedures for the nurse. Another member of the Executive Committee or the N. A. C. and the public health nurse ought to be present at any such meeting, and to be given ample opportunity to explain and to answer questions.

Three general principles recognized by the Chapter and the nurse as governing her activities should be stated as follows:

1. The nursing of patients shall be carried on only under the direction of a physician.

2. In advising relative to securing medical treatment, the nurse does not choose between schools of medicine, or between individual practitioners. Such choice must be left to the individual or to the individual's family.

3. The nurse advises with reference to securing special surgical and medical treatment, but only after consultation with the physician, where one is available.

The first applies; of course, only to actual nursing. Prenatal care, as well as other forms

of advisory service in the rural districts, may be, and usually is, carried on by a nurse for some time while she is trying to persuade the patient to see a doctor.

The second means that a nurse should not suggest that a patient employ an allopath in preference to a homeopath, an oculist in preference to an optometrist, Doctor Jones in preference to Doctor Smith, or even advise against chiropractics.

The third refers to the nurse's procedure in those cases which need the care of a specialist, such as a mental, orthopedic or tuberculous case.

*III. Professional problems arising in the process of caring for the sick and of applying the above principles.* After presentation and explanation of these regulations, certain problems that are sure to arise early in the performance of the nurse's work might be discussed. Some of these are as follows:

1. Will the doctors authorize a set of standing orders which the nurse may use in giving nursing care on her first visit to a patient, if the patient has no doctor or if the nurse cannot get in touch with the patient's doctor, and may also use on subsequent visits if the doctor in attendance has left no orders for the nurse and cannot be reached?

It is understood that such orders do not authorize a nurse to continue giving nursing care to a patient who has no doctor; that the nurse will give no nursing care after the first visit if there is no doctor in charge; and that the nurse will make every effort to get in touch with the doctor in order to secure his specific instructions in person.

A suggested set of standing orders is attached. This is a copy of the set in use by the Chicago Visiting Nurse Association, authorized by the Chicago Medical Society. Other large city visiting nurse associations have almost identical standing orders authorized by their respective medical societies.

2. In the absence of a public doctor for the poor, to whom shall the nurse refer indigent patients for diagnosis and treatment?

3. In the absence of a family doctor, or if the patient does not know the local doctors and asks the nurse to recommend someone, what would the Medical Society suggest that she do? The usual practice is to give the patient a list of all the doctors in the neighborhood, but not to recommend any particular doctor.

*IV. Professional problems arising in the inauguration of school nursing.* Where the Red Cross inaugurates school nursing and the Board of Education or other public department does not provide school doctors, the Chapter, in coöperation with the Board of Education, will:

a. Ask volunteer assistance from the Medical Society.

b. If unable to get voluntary medical assistance, will explain to the Medical Society the need and extent of health inspection as carried on by school nurses, and will get its approval of such inspection.

c. Will adopt, with the approval of the Medical Society, policies concerning the securing of medical attention for indigent children, the exclusion of children from school for symptoms of communicable diseases, and the issuing of standing orders to nurses for the treatment of cuts, bruises, burns, and similar minor ailments. (If standing orders for nursing care, as described above, have not already been secured.)

Health work by Chapter school nurses forbids the nurse to make diagnoses, to recommend specific treatment, or to refer the children to individual doctors other than the family doctor. It permits the observation of condition of eyes, ears, nose, throat, skin, breathing, posture, general physical and mental make-up, and notification of these conditions, with explanation to parents. It recommends that competent professional advice be sought; also instruction in hygiene,—personal, home and school,—and the organization of health clubs and classes.

In order to accomplish this, the Chapter official, the doctor on the N. A. C., the superintendent of schools, and the public health nurse might meet with the Medical Society or the doctors as a group to present and explain these problems of school nursing.

*V. Professional problems arising from the needs of clinics.* When the work of the nurse uncovers a pronounced need for medical or surgical treatment for which there is no adequate local provision and no existing agency ready able to develop the necessary facility, the need should be placed before the Medical Society or doctors as a group, the same way as described above.

The establishment of a clinic should be presented as something that needs to be done and that preferably the local doctors should do it by providing their services in rotation or according to some other equitable plan. If they have not the time or do not feel qualified to conduct special clinics, or do not want to do so, their suggestions should be requested as to how the necessary medical service for the clinic can best be secured. No doctor should be brought in from outside until the local doctors have considered the work themselves, and have approved of the introduction of an outside man. No doctor should be brought in of whom they do not approve.

In all clinics in which it participates, the Red Cross insists that the responsibility for and direction of medical work shall be solely in the hands of the medical profession. As to

payment of services by patients, this shall be determined by, and according to, a procedure approved by the local Medical Society. The Red Cross approves the principle of payment for medical service at a reasonable price, and if this payment cannot be obtained from the patient, that physicians should receive the proper remuneration from some agency for professional services they may render. Where physicians are engaged, therefore, in a clinic in which the Red Cross participates, the Red Cross will discourage the employment of volunteer physicians for this purpose, and encourage the provision of an adequate fee for the physician.

Consultation centers for expectant mothers and well babies are not considered to be clinics, and although the Red Cross recognizes the very great desirability of having a doctor in attendance at consultations of these kinds, it believes that much good can be accomplished without the attendance of a physician, and it will undertake to establish such consultation centers with a public health nurse in charge and without the immediate supervision of a physician when such cannot be obtained.

#### STANDING ORDERS FOR THE PUBLIC HEALTH NURSE.

*For All New Patients.* Cleansing bath, P. R. N. Instruction in hygiene of the sickroom, with special emphasis on good ventilation, cleanliness, and diet suited to the patient's conditions and needs.

*For Patient with Fever, Undiagnosed.* Liquid diet. Low S. S. enema, P. R. N. when no abdominal pain or tenderness is present. Sponge for R. T. 102.5.

*For Infants and Children with Fever, Undiagnosed.* Normal salt flushing, P. R. N. Diet—Boiled water for twenty-four hours.

*Burns.* Remove clothing if not attached to skin. If adherent, cut away as much as possible and apply normal salt or boric solution dressings.

*Colds.* Low S. S. enema. Liquid diet. For adults, plenty of hot water to drink.

*Infantile Diarrhea and Infantile Convulsions.* Normal salt flushing, P. R. N. No food. Boiled water for twenty-four hours.

*For Infectious Diseases.* Isolate. Boric solution for eyes and nostrils, P. R. N. Vaseline or cold cream for lips and nose, P. R. N. Oil rub, P. R. N., for all desquamating cases. Liquid diet. Sponge for R. T. 102.5.

*For Discharging Ears.* Cleanse the outer ear with moist boric solution swabs. Dry thoroughly. Do not irrigate. Emphasize need of prompt medical attention.

*For Dressings, Minor* (Cuts, Bruises, Infected Fingers, Scratches). Apply hot boric packs. Advise medical attention.

*For pleurisy.* Apply tight binder to chest.

A SUMMARY OF THE NUMBER OF COMMUNITIES IN THE NEW ENGLAND DIVISION OF THE AMERICAN RED CROSS  
IN WHICH RED CROSS HEALTH WORK HAS BEEN OR IS NOW BEING CARRIED ON.

NURSING.	CLINICS.		CONFERENCE.		EXHIBITS		FEBRUARY 28, 1922	LIFE-SAVING.
	Number	Number	Number	Number	Number	Number		
Maine .....	27	19	1	3	1	3	1	400
New Hampshire .....	30	15	2	2	1	1	89	88
Vermont .....	18	17	3	5	3	4	4	14
Massachusetts .....	37	10	6	1	2	13	1	118
Rhode Island .....	4	1	1	1	1	1	1	2
Totals .....	116	62	9	1	29	13	28	114

Seventeen general nursing services have been taken over by public authorities, fifteen by private authorities; a total of thirty-five.

First-Aid figures in preparation.

**Pneumonia.** Cold air treatment if possible. Low S. S. enema, P. R. N. Sponge for R. T. 102.5. Liquid diet.

STANDING ORDERS FOR THE VISITING NURSE  
ASSOCIATION OF CHICAGO.

**Sore Throat.** Liquid diet. Isolate, if possible, until physician sees case.

**Typhoid Fever.** Low S. S. enema, P. R. N. Sponge for R. T., 102.5. Milk diet. Emphasize need of screens, fresh air, cold drinking water (boiled, if possible). Disinfection of stools.

**Ulcers, Chronic.** Cleanse with lysol or boric solution. Apply hot boric dressings and firm bandage.

**Obstetrical Cases.** For the Mother—Cleansing bath; local cleansing with lysol solution; abdominal binder; change pads; breast binder, P. R. N.; low S. S. enema, P. R. N. For the Baby—Alcohol dressing to cord; oil and bathe; soap suppository, P. R. N.

[N. B.—Any or all of these orders may be cancelled or substituted for at any time by the physician on the case who prefers to leave specific written orders in each family. These standing orders are merely suggested as aids to both the physician and nurses, and will be carried out when no other orders are left. Nurses will communicate with the physicians by telephone whenever possible, but the above orders are intended to serve for the interim.]

THE AMERICAN SOCIETY FOR THE  
CONTROL OF CANCER.

THE annual meetings of the American Society for the Control of Cancer and of its Board of Directors were held in New York City on February 25th. The following officers were elected:

President: Dr. Chas. A. Powers.

Vice-Presidents: Dr. Clement Cleveland, Dr. M. F. Engman, Dr. James Ewing, Dr. Edward Reynolds.

Honorary Vice-President: Sir Arthur Newsome.

Secretary: Thomas M. Debevoise.

Treasurer: Calvert Brewer.

Chairman of the Board of Directors: Dr. Edward Reynolds.

Chairman of the Finance Committee: Mrs. Robert G. Mead.

Dr. Chas. N. Dowd, Dr. John C. A. Gerster, and Mrs. Samuel Adams Clark were elected Directors to serve for three years.

The report of President Powers was read and accepted. It detailed the greatly increased activities of the last year and the pressing de-

\*One obstetrical in Massachusetts.

mands for extension of the work of the Society which were daily coming in.

The report of the Finance Committee showed that the expenditures of the last year had amounted to \$24,053.28. A Budget Committee reported that in view of the pressing demands for extension the expenditures for the forthcoming year could not amount to less than \$60,000, and the Executive Committee reported that the raising of this sum was made feasible by a gift of \$50,000 from the Lasker family, the capital to be held, and the income expended, by the Society; and by a grant of \$26,750 from the Commonwealth Fund, which sums, taken in connection with the existing annual subscriptions, would amount to approximately \$45,000. It recommended, further, that active work towards raising this amount would be at once undertaken, and that since these large gifts form so large a proportion of the income of the Society, this additional \$15,000 should properly be raised by small subscriptions which should, so far as possible, be obtained from benefactors widely distributed over the United States as a whole. It is believed that a reduction of one-third in the mortality of the disease may fairly be expected within a few years as the result of the campaign of education which the Society proposes.



### Miscellany.

#### CANCER DAY.

WORCESTER, FEBRUARY 24, 1922.

THE Mayor of Worcester, Hon. Peter F. Sullivan, appreciating the importance of the opportunity to further the cause of cancer prevention occasioned by the visit of such an eminent authority as Dr. Joseph Colt Bloodgood, was good enough to issue a proclamation to the citizens, calling attention to the prevalence of cancer, the possibilities of greatly lowering the death rate and morbidity by suitable preventive measures, and urging all to inform themselves upon the subject by attending the public meeting.

The Press of Worcester rendered most valuable assistance by assigning capable and well-informed reporters to the work of preparing the numerous articles which they published. The excellent circulars published by the Society for Cancer Control formed the bases for these articles, which were so edited as to give the "local color" which the newspaper men considered necessary.

Dr. Bloodgood arrived in Worcester on the 11 o'clock train and devoted the morning and

early afternoon to a round of the hospitals of Worcester, at each of which he was shown the surgical and laboratory equipments which he studied from the point of view of cancer treatment and study, giving suggestions now and then as to equipment and methods, and at Worcester City Hospital making a brief address to the off-duty nurses in the chapel.

Dr. Homer Gage entertained Dr. Bloodgood at lunch at his home, 8 Chestnut Street.

At 4.30 P.M., a joint meeting of the Worcester District Medical Society, the Worcester Homeopathic Society, and Worcester Dental Society was held in the small ballroom at the Bancroft Hotel, which was crowded to capacity. Dr. Bloodgood lectured upon "Cancer of the Mouth," illustrating both by lantern slides and demonstration of a case, presenting the subject largely from the diagnostic and preventive viewpoint.

At 6.30 P.M., a dinner was tendered Dr. Bloodgood, by Physicians and Dentists, at which the Clergy, Chamber of Commerce, Rotary and Kiwanis Clubs, and the Press were represented, after which the large ballroom at the Hotel Bancroft was thrown open to invited guests and was quickly filled to capacity. A violin *obligato*, beautifully rendered by Miss Lillian Berkowitz, was quickly followed by the photoplay, "The Reward of Courage," which pleased the audience by the human appeal of its story, which at the same time revealed the economic and social side of the cancer problem. The animated drawing, illustrating the growth and metastasis of cancer, with relative curability at each stage, was most instructive.

After the photoplay, Dr. S. B. Woodward, former President of the Massachusetts Medical Society, and President of the Worcester Chamber of Commerce, welcomed the guests in the name of the associated societies, with clearness and brevity presented the ideal of preventive medicine as the actuating motive of the gathering, and then introduced Dr. Bloodgood, who held the closest attention of the great audience for nearly an hour, showing by lantern slides, anecdote, forceful description and convincing statistics, the seriousness of the cancer problem, the futility of belated effort to cure cancer as contrasted to the success of intervention in the early or precancerous stages. He contrasted the favorable results of recent years since publicity had come to the aid of the doctor, by disseminating information and bringing in the early cases, with the unfortunate results of the most skilful surgery in previous times when most cases came in late.

The Press reports of the actual lecture were on a plane quite equal to the previous notices, and the Committee of Arrangements had the satisfaction of feeling that the word of hope and of timely warning had reached into nearly every home in Worcester and vicinity.

## THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

THE arrangements of the St. Louis profession for the meeting places for the Session of the A. M. A., which is to be held in their city May 22-26 next, are singularly fortunate and convenient; never has the Association been so well favored in this respect. The district in which the meeting is to take place is at the west edge of the business section of the city, easily accessible from all directions, by street cars or otherwise, and not more than fifteen minutes' street-car ride from the most distant hotel. The grouping of the meeting places is so compact that should one walk from the Registration Building (Moolah Temple) to the farthest hall, it can be done in ten minutes or less; from section to section is a matter of from one to five minutes. The convenience of the location and arrangements of the different halls is more outstanding than in any other city in which the Association has met, and a decided improvement over the accommodations which were had at the meeting in St. Louis in 1910.

The Registration Office, Postoffice, and Commercial Exhibit is to be in the Moolah Temple (Shrine), a beautiful and commodious building on Lindell Boulevard, two blocks west of Grand Avenue. At the other extremity of the group is the Odean, the home of the St. Louis Symphony Orchestra, with a main hall which seats better than 2000, and several lesser halls. The main hall will be used for the opening session. Its acoustics are particularly good and suited to our purpose. The Sections on Practice of Medicine and of Diseases of Children meet here. In the Assembly Hall of the same building the Sections on Pharmacology and Therapeutics, and on Pathology and Physiology will meet. (It will be noted that there has been an aim to foregather closely allied sections.) The Sheldon Memorial, a very beautiful new hall on Washington Avenue, one-half block west of Grand Avenue, which most admirably meets all requirements, will be the meeting place of the Sections on Ophthalmology, and Laryngology, Otology and Rhinology. The Section on Surgery, General and Abdominal, and on Obstetrics, Gynecology and Abdominal Surgery, will be held in the Third Baptist Church, on Grand Avenue, a situation well suited to the demands. The Sections on Orthopedics, and Nervous and Mental Diseases will meet in the Law School of the St. Louis University, on Lindell Avenue, a few steps west of Grand. The hall easily seats 500, and is both comfortable and convenient. Dermatology and Syphilis and Urology will use the large Union Methodist Church on Delmar Avenue, just west of Grand, which meets every re-

quirement. The Sections on Gastroenterology, Proctology, and on Preventive Medicine will use the large hall in the Musicians' Club, on Pine Street, east of Grand Avenue, and next to the building of the St. Louis Medical Society, where the House of Delegates will hold its sessions. The Section on Stomatology is assigned to the Assembly Hall of St. Peter's Parish House, one block west of Grand, on Lindell Avenue. Immediately in this district will be found three of St. Louis' most important Clubs—the St. Louis, University, and Columbian. Restaurants, catering to every grade of patronage, are numerous in the district, and precautions have been taken to insure that normal rates continue during the meeting.

The St. Louis profession is preparing for an unusual attendance. Hotel reservations are coming in rapidly, but it is purposed that even the late-comer shall be comfortably housed. The wise traveler, however, makes his reservation as early as he finds it possible. Dr. M. B. Clopton, 3525 Pine Street, St. Louis, is Chairman of the Committee on Sections and Section Work.

## LEGISLATIVE MATTERS.

THE report of the Special Commission on State Administration was considered by the Committee on State Administration March 15. Although much of the report has to do with financial affairs, there are some sections of great interest to physicians. The purpose of the recommendations is to reduce the number of state departments from twenty to nine, and reorganize the relations of the various boards to departments.

The Commissioner of Public Health, under the proposed changes, would be appointed by the Governor for a term coterminous with that of the Governor, and the four health sanatoria (tuberculosis) would be transferred to the Department of Public Welfare.

One can find no adequate reason for this change, for the problems of tuberculosis are distinctly medical and should be under the supervision of the Health Department. The inference which may be drawn from statements made before the Committee is to the effect that there is lack of uniformity in carrying on details of domestic or business affairs, as shown by those in charge of the sanatoria. In other words, it is claimed that a superintendent should be concerned more largely with the professional problems of those under his care. It seems to be believed that doctors should not be responsible for activities outside of the hospital walls. This is a rather narrow conception of the functions of a medical superintendent,

for many physicians are interested in agriculture, and get good results.

A physician should have a diversity of activities, and if he finds enjoyment in the out-of-door affairs, other than golf or tennis, he may get that relaxation which follows relief from close attention to professional duties. The life of a medical officer in a sanatorium is dreary at times, and his desire to regulate the surroundings of his institution, grow flowers, or raise foodstuffs, may, if encouraged, give him much-needed change.

The powers of the State Department of Health could be extended to advantage, but it seems to be difficult to impress on some people the tremendous value of the trained public health official to the state.

After the demonstration made by the profession in the assistance rendered the Government in the World War, one would expect that physicians would be given greater opportunities for public service. Men interested in financial matters seem, sometimes, to lose the human touch.

The Commission recommends the transfer of the Board of Registration in Medicine, together with other registration boards, to the Department of Public Safety. It has long been felt by many that these boards governing registration of professional men should be in the Department of Public Health or the Department of Education.

#### THE MIDWIFE BILL.

It is reported that the Committee on Public Health will recommend the passage of the midwife bill. This seems to be the result of influence brought to bear by the medical profession in Springfield. If so, one can ask why physicians want the inadequately educated midwife to take care of obstetric work, and yet seek to restrain the well-educated nurse from performing the same service?

The ordinary, well-trained nurse is better qualified to conduct obstetric cases and discover indications of disease than even the better class of midwives; but if a nurse should enter upon this practice, it is probable that physicians would be united in opposition.

**THE NORFOLK DISTRICT MEDICAL SOCIETY.**—A regular meeting of the Society will be held at Masonic Temple, 171 Warren St., Roxbury, March 28, 8.15 p. m. Telephone Roxbury 50089. Business: Communication, The Failing Heart, Paul D. White, M.D.; Discussion, William H. Robey, M.D. Refreshments after the meeting. The Censors meet May 4th. Annual Meeting May 9th. C. D. Knowlton, M.D., President; Bradford Kent, M.D., Secretary.

#### THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH.

REPORTED WEEK ENDING MARCH 11, 1922.			
Disease	No. of Cases	Disease	No. of Cases
Anterior poliomyelitis	1	Mumps	140
Chicken-pox	115	Ophthalmia neonatorum	23
Diphtheria	147	Pellagra	1
Dog-bite requiring anti-rabic treatment	4	Pneumonia, lobar	284
Encephalitis lethargica	7	Scarlet fever	249
Epidemic cerebro-spinal meningitis	3	Septic sore throat	6
German measles	19	Syphilis	37
Gonorrhea	79	Suppurative conjunctivitis	13
Influenza	521	Trachoma	3
Malaria	2	Tuberculosis, pulmonary	141
Measles	590	Tuberculosis, other forms	21
		Typhoid fever	5
		Whooping-cough	112

#### MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS.

—Dinner and meeting at the Copley Plaza Hotel, Thursday, March 30, 6.30 p. m., \$2.00 a plate. Speakers: Dr. Edward H. Nichols, "The Volstead Act in Relation to Trauma"; Dr. George K. Pratt, "The Volstead Act with Reference to Mental Diseases"; Dr. John Bryant, "Visceroptosis in Relation to Industrial Disability." Discussion opened by Dr. William J. Brickett, Wm. Pearce Cones, Pres.; Hilbert F. Day, Secy.

**THE RESEARCH CLUB OF THE HARVARD MEDICAL SCHOOL.**—The meeting to be held on Friday, March 24th, in the Amphitheatre of Building A, at 12.30 o'clock, will be addressed by Dr. E. E. Tyzzer, on "Black Head in Turkeys."

**BELLEVUE HOSPITAL MEDICAL COLLEGE.**—The twenty-fifth anniversary dinner of the Class of '97 will be held at the Hotel Commodore, on Saturday evening, March 25, 1922. Get-together, 7 p. m. Dinner served at 7:30 p. m., sharp. Note change of date from March 20th to March 25th.

**MASSACHUSETTS GENERAL HOSPITAL.**—The next clinical meeting of the Out-Patient Staff will be held at 12 Noon, on March 29th, in the lower Out-Patient Amphitheatre. Program: Local Anesthesia, Dr. A. W. Allen; Gummatous Cervical Adenitis, Dr. W. P. Cones; Anesthesia in the Reduction of Fractures, Dr. G. A. Leland, Jr.; Report on the Sterility Clinic, Dr. A. W. Reggio; Cases of Tendon Surgery, Dr. T. W. Harmer.

#### MEDICAL REGISTRATION.

Forty-one applicants for medical registration were examined by the board last month. The practical examinations were conducted at the Boston University School of Medicine.

#### NORMAN FITCH CHANDLER, M.D.

Dr. NORMAN F. CHANDLER, for thirty years one of the leading physicians of Medford, died at his home in that city March 6, 1922, at the age of 62. He was born in Moers, N. Y., April 10, 1859, was a graduate of Harvard Medical School in the class of 1888, serving as house officer at the Massachusetts General Hospital and at the Boston Lying-In Hospital, settling then in practice in Medford. He married Alice Bemis, daughter of the late Dr. C. V. Bemis of Medford. She survives him, as do a daughter and a son, Capt. Norman Bemis Chandler, a graduate of Harvard College in 1917, who saw service overseas in the infantry of the regular army.

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